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WORK PLAN

For Watershed Protection and Flood Prevention

UPPER SALT CREEK WATERSHED

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOCATION IN ILLINOIS



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WATERSHED WORK PLAN

UPPER SALT CREEK WATERSHED

Cook, Lake, and DuPage Counties, Illinois

Prepared Under the Authority of the Watershed
Protection and Flood Prevention Act (Public Law 566,
83rd Congress, 68 Stat, 666), as Amended

Prepared by:

NORTH COOK SOIL AND WATER CONSERVATION DISTRICT
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
COOK COUNTY FOREST PRESERVE DISTRICT
VILLAGE OF ELK GROVE
VILLAGE OF SCHAUMBURG
VILLAGE OF ROLLING MEADOWS
VILLAGE OF PALATINE
PALATINE PARK DISTRICT
SCHAUMBURG PARK DISTRICT
SALT CREEK RURAL PARK DISTRICT
ELK GROVE PARK DISTRICT
STATE OF ILLINOIS

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With Assistance By:

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE

May 1973

WATERSHED WORK PLAN AGREEMENT

between the

NORTH COOK SOIL AND WATER CONSERVATION DISTRICT
THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
COOK COUNTY FOREST PRESERVE DISTRICT
VILLAGE OF ELK GROVE
VILLAGE OF SCHAUMBURG
VILLAGE OF ROLLING MEADOWS
VILLAGE OF PALATINE
PALATINE PARK DISTRICT
SCHAUMBURG PARK DISTRICT
SALT CREEK RURAL PARK DISTRICT
ELK GROVE PARK DISTRICT
STATE OF ILLINOIS

(hereinafter referred to as the Sponsoring Local Organization)

State of Illinois

and the

SOIL CONSERVATION SERVICE
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the Upper Salt Creek Watershed, State of Illinois, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666), as amended; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the Upper Salt Creek Watershed, State of Illinois, hereinafter referred to as the watershed work plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan can be installed in about 9 years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed work plan:

1. The Sponsoring Local Organization will acquire without cost to the federal government such land rights as will be needed in connection with the works of improvement. (Estimated cost \$7,827,500). These costs are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (name)	<u>Sponsoring Local Organization</u> (percent)	<u>Estimated Land Rights Cost</u> (dollars)
Multiple-purpose recreation development structure 1			
Dam	Cook County Forest Preserve District	100	252,000
	State of Illinois	100	220,000 <u>1/</u>
Dredging (Spoil Disposal area)	State of Illinois	100	204,000
Recreation Facilities	Cook County Forest Preserve District	100	0 <u>2/</u>
Floodwater retarding structures			
2	The Metropolitan Sanitary Dist. of Greater Chicago	100	1,474,500
3	The Metropolitan Sanitary Dist. of Greater Chicago	100	1,515,000
4	Village of Palatine	100	205,000
4	The Metropolitan Sanitary Dist. of Greater Chicago	100	200,000
5	The Metropolitan Sanitary Dist. of Greater Chicago	100	405,000
6	The Metropolitan Sanitary Dist. of Greater Chicago	100	557,000
Channel Improvement	State of Illinois	100	230,000 <u>3/</u>
Flood plain preserves			
Reach B (60 acres)	The Metropolitan Sanitary Dist. of Greater Chicago	100	600,000
Reach B (15 acres)	Village of Palatine	100	150,000
Reach G (111 acres)	Village of Schaumburg	100	1,110,000
Reach H (3 acres)	Village of Schaumburg	100	30,000
(61 acres)	Village of Elk Grove	100	610,000
(11 acres)	The Metropolitan Sanitary Dist. of Greater Chicago	100	110,000

1/ Minor modification and/or rerouting of two utility lines and four pipelines.

2/ Facilities in existing development will be increased. No additional land needed.

3/ Includes \$100,000 for utility line modification and bridge replacement costs.

1. (continued)

The Sponsoring Local Organization agrees that all land improved with PL-566 financial or credit assistance will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

2. The Sponsoring Local Organization will provide relocation advisory assistance services and make the relocation payments to displaced persons as required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. Prior to July 1, 1972, the Sponsoring Local Organization will comply with the real property acquisition policies contained in said Act and Regulations to the extent that they are legally able to do so in accordance with their State law. After July 1, 1972, the real property acquisition policies contained in said Act shall be followed in all cases.

The Service will bear 100 percent of the first \$25,000 of relocation payment costs for any person, business, or farm operation displaced prior to July 1, 1972. Any such costs for a single dislocation in excess of \$25,000 and all costs for relocation payments for persons displaced after July 1, 1972, will be shared by the Sponsoring Local Organization and the Service as follows:

Relocation Payments Multiple-purpose recreation development Structure 1	Sponsoring Local Organization (name)	Sponsoring Local Organization (percent)	Service (percent)	Estimated Relocation Payment Costs (dollars)
	State of Illinois	55.2	44.8	90,000

3. The Sponsoring Local Organizations will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement as follows:

Works of Improvement

Multiple-purpose Recreation Development Structure 1
Floodwater Retarding Structures 2, 3, 4, 5, & 6
Channel Improvement

Sponsoring Local Organization

State of Illinois
The Metropolitan Sanitary District
State of Illinois

4. The percentages of construction costs of structural measures to be paid by the Sponsoring Local Organization and by the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization (name)</u>	<u>Sponsoring Local Organization (percent)</u>	<u>Service (percent)</u>	<u>Estimated Con- struction Cost (dollars)</u>
Multiple-purpose Recreation Development Structure 1				
Dam	State of Illinois	17.9	82.1	576,200
Dredging	State of Illinois	50.0	50.0	1,700,000
Recreation Facilities	State of Illinois (18.8%) and Cook County Forest Preserve District (31.27)	50.0	50.0	6,670,000
Floodwater Retarding Structures 4, 5, & 6	The Metropolitan Sanitary Dist. of GC	--	100.0	3,490,000
Floodwater Retarding Structure 2	Palatine Park District	31.7 <u>1/</u>	68.3	145,100
Floodwater Retarding Structure 3	Schaumburg Park District	26.5 <u>1/</u>	73.5	354,500
Channel Improvement	State of Illinois	--	100.0	117,100

1/ Non-project costs for reservoir excavation and shaping.

5. The percentages of the engineering costs to be borne by the Sponsoring Local Organization and the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization (name)</u>	<u>Sponsoring Local Organization Service (percent) (percent)</u>		<u>Estimated Engineering Costs (dollars)</u>	
		(percent)	(percent)	(dollars)	(dollars)
Multiple-purpose Recreation Development Structure 1 Dam	State of Illinois	--	100.0	57,600	
	State of Illinois	--	100.0	170,000	
	Cook County Forest Preserve District	50.0	50.0	533,600	
Floodwater Retarding Structures 2, 3, 4, 5, & 6	The Metropolitan Sanitary Dist. of GC	--	100.0	484,100	
Channel Improvement	State of Illinois	--	100.0	23,400	

6. The Sponsoring Local Organization and the Service will each bear the costs of project administration which it incurs, estimated to be \$283,600 and \$2,127,200 respectively.

7. The North Cook Soil and Water Conservation District will obtain agreements from owners of not less than 50 percent of the land above each reservoir and floodwater retarding structure that they will prepare and implement conservation resource plans on their land.

8. North Cook Soil and Water Conservation District will provide assistance to landowners and villages to assure the installation of the land treatment measures shown in the watershed work plan.

9. The Sponsoring Local Organization will encourage landowners and villages to operate and maintain the land treatment measures for the protection and improvement of the watershed.

10. The Sponsoring Local Organization will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

(6)

11. The Sponsoring Local Organization will assume channel maintenance to insure that the channels remain essentially unaltered in all evaluated areas within their legal jurisdiction.

12. The Sponsoring Local Organization will operate and maintain the land and pool areas associated with the 5 single-purpose structures and multiple-purpose structure 1 as public recreation areas. This responsibility will be in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

13. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties heretofore the actual costs incurred in the installation of works of improvement will be used.

14. This agreement is not a fund obligating document. Financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the appropriation of funds for this purpose.

A separate agreement will be entered into between the Service and the Sponsoring Local Organization before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

15. The watershed work plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto, except that an amendment to incorporate changes affecting merely one specific structural measure may be made by mutual agreement between the Service and the Sponsor(s) having specific responsibilities for the particular structural measure involved.

16. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

17. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any activity receiving federal financial assistance.

NORTH COOK SOIL AND WATER CONSERVATION DISTRICT

By /s/ Tom HamiltonTitle ChairmanAddress P.O. Box 555
Lake Zurich, Illinois 60047

(Zip Code)

Date August 13, 1972

The signing of this agreement was authorized by a resolution of the governing body of the North Cook Soil and Water Conservation District adopted at a meeting held on February 7, 1972.

/s/ John Hunt

(Secretary, Local Organization)

Address P. O. Box 555
Lake Zurich, Illinois 60047

(Zip Code)

Date August 13, 1972

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

By /s/ John E. Egan /s/ Valentine Janicki
Chairman,Title President Committee on FinanceAddress 100 East Erie Street
Chicago, Illinois 60611

(Zip Code)

Date August 13, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Metropolitan Sanitary District of Greater Chicago adopted at a meeting held on April 22, 1971.

/s/ Gus G. Sciacqua

(Secretary, Local Organization)

Address 100 East Erie Street
Chicago, Illinois 60611

(Zip Code)

Date August 13, 1972

COOK COUNTY FOREST PRESERVE DISTRICT

By /s/ George W. DunneTitle President118 North Clark StreetAddress Chicago, Illinois 60602(Zip Code)Date August 13, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Cook County Forest Preserve District adopted at a meeting held on _____.

/s/ Benedict Garmisa(Secretary, Local Organization)118 North Clark StreetAddress Chicago, Illinois 60602(Zip Code)Date August 13, 1972

VILLAGE OF ELK GROVE

By /s/ Charles J. ZettekTitle PresidentAddress Elk Grove Village, Illinois 60007(Zip Code)Date August 13, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Village of Elk Grove adopted at a meeting held on February 8, 1972.

/s/ Richard A. McGrenera(Secretary, Local Organization)(By Fay Bishop, Deputy Clerk)Address Elk Grove Village, Illinois 60007(Zip Code)Date August 13, 1972

VILLAGE OF SCHAUMBURG

By /s/ Robert O. AtcherTitle PresidentAddress Schaumburg, Illinois 60172
(Zip Code)Date September 12, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Village of Schaumburg adopted at a meeting held on September 12, 1972.

/s/ Sandy Carsello(Secretary, Local Organization)
Village ClerkAddress Schaumburg, Illinois 60172
(Zip Code)Date September 12, 1972

CITY OF ROLLING MEADOWS

By /s/ Roland J. MeyerTitle MayorAddress Rolling Meadows, Illinois 60008
(Zip Code)Date August 23, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Village of Rolling Meadows adopted at a meeting held on March 14, 1972.

/s/ Elizabeth A. Hauldsworth(Secretary, Local Organization)
Deputy Clerk3600 Churchill Road
Address Rolling Meadows, Illinois 60008
(Zip Code)Date August 23, 1972

VILLAGE OF PALATINE

By /s/ John Moody

Title Village President

Address Palatine, Illinois 60067
(Zip Code)

Date August 28, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Village of Palatine adopted at a meeting held on September 28, 1970
March 22, 1971

/s/ Louise A. Jones
(Secretary, Local Organization)

Address Palatine, Illinois 60067
(Zip Code)

Date August 28, 1972

PALATINE PARK DISTRICT

By /s/ Ralph Wiehrdt

Title Vice President

262 E. Palatine Road
Address Palatine, Illinois 60067
(Zip Code)

Date August 22, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Palatine Park District adopted at a meeting held on August 22, 1972 .

/s/ Roger A. Bjorvik
(Secretary, Local Organization)

262 E. Palatine Road
Address Palatine, Illinois 60067
(Zip Code)

Date August 22, 1972

SCHAUMBURG PARK DISTRICT

By /s/ Robert F. BockTitle PresidentAddress Schaumburg, Illinois 60172
(Zip Code)Date September 14, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Schaumburg Park District adopted at a meeting held on July 9, 1970.

/s/ Elaine Bond(Secretary, Local Organization)
220 E. Weathersfield Way
Address Schaumburg, Illinois 60172
(Zip Code)Date September 14, 1972

SALT CREEK RURAL PARK DISTRICT

By /s/ Patrick GrealishTitle President530 S. Williams Street
Address Palatine, Illinois 60067
(Zip Code)Date August 29, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Salt Creek Rural Park District adopted at a meeting held on August 8, 1972.

/s/ Mike D. Stronberg(Secretary, Local Organization)
530 S. Williams Street
Address Palatine, Illinois 60067
(Zip Code)Date August 29, 1972

ELK GROVE PARK DISTRICT

By /s/ Edward R. Hauser

Title President

499 Biesterfield Road
Address Elk Grove, Illinois 60007
(Zip Code)

Date August 24, 1972

The signing of this agreement was authorized by a resolution of the governing body of the Elk Grove Park District adopted at a meeting held on July 22, 1971.

/s/ Lewis L. Smith
(Secretary, Local Organization)

499 Biesterfield Road
Address Elk Grove, Illinois 60007
(Zip Code)

Date August 24, 1972

STATE OF ILLINOIS

By /s/ Richard B. Ogilvie

Title Governor

Date August 13, 1972

SOIL CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

Appropriate and careful consideration has been given to the environmental statement prepared for this project and to the environmental aspects thereof.

By _____

Title _____

Date _____

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WATERSHED WORK PLAN

UPPER SALT CREEK WATERSHED

Cook, Lake, and DuPage Counties, Illinois

May 1973

SUMMARY OF PLAN

Upper Salt Creek Watershed covers a 33,280-acre area primarily in Cook County with minor areas in Lake and DuPage Counties, Illinois.

Sponsors of the watershed work plan are the North Cook Soil and Water Conservation District; the Metropolitan Sanitary District of Greater Chicago; Cook County Forest Preserve District; State of Illinois; Village of Elk Grove; Village of Schaumburg; Village of Rolling Meadows; Village of Palatine; Palatine Park District; Schaumburg Park District; Salt Creek Rural Park District; and Elk Grove Park District.

Technical assistance in the preparation of the plan was furnished by the U. S. Department of Agriculture, Soil Conservation Service and Forest Service; and the State of Illinois, Department of Conservation.

Erosion in the rolling upland areas is estimated at 70 tons of soil movement per acre during the period when these areas are being converted from agricultural land uses to urban-type developments. Resulting sediment covers streets and clogs storm sewers and downstream channels.

Floodwater damage is presently a major watershed problem which is increasing as urbanization increases and flood plain buildup continues. Flooding has caused extensive damage to homes, personal property, schools, and businesses. In addition, flooding closes roads, isolating many areas and interrupting transportation on major highways. Approximately 1,940 acres are presently subject to flooding in Upper Salt Creek watershed. Another 1,440 acres are subject to flooding in Lower Salt Creek Watershed. It is estimated that the floodwater damages in Upper Salt Creek Watershed will soon average \$853,500 annually.

Needs for developed recreation areas and open space for public use are rapidly becoming critical. The demand for high quality water-based recreation facilities far exceeds the supply within the metropolitan area of Chicago.

The Sponsoring Local Organizations have developed this plan to (1) reduce flood damages by such means as (a) reducing soil and water losses from the upland areas, (b) reducing the area subject to flood-water damage, (c) controlling buildup in areas identified as having flood hazards, (d) providing technical assistance for floodproofing measures, (e) preventing adverse alterations of existing channels, (f) establishing flood plain preserves, and (2) create needed water related recreation facilities for use by the general public.

Other than PL-566 costs for proposed land treatment measures are estimated to be \$1,874,000. Included in these costs is \$63,000 for technical assistance. PL-566 costs are estimated to be \$95,000. Soil surveys for the watershed are complete.

Installation of planned forestry land treatment measures on about 40 acres of privately-owned land is estimated to cost \$1,900. Local installation costs are estimated to be \$1,300 while technical assistance costs are \$600. Technical assistance if requested will be provided for by the existing State and Federal cooperative forest management programs.

Planned structural measures consist of 5 floodwater retarding structures, one multiple-purpose (flood prevention-recreation) structure with basic facilities, 261 acres of flood plain preserve (Reaches B, G, and H), and approximately 1.8 miles of channel improvement (Reach F). Costs for structural measures are estimated to total \$24,554,900. The PL-566 share of this cost is \$11,794,100 while the other than PL-566 costs are \$12,760,800.

Project installation is scheduled to be completed in a 9-year period. The Metropolitan Sanitary District; the Cook County Forest Preserve District; the villages of Palatine, Schaumburg, and Elk Grove; the Schaumburg Park District; the Palatine Park District; and the Salt Creek Rural Park District will defray other than PL-566 costs for construction, engineering services, land rights, and project administration.

The aforementioned organizations will be joined by the Elk Grove Park District, Village of Rolling Meadows, and the Illinois Division of Highways in the operation and maintenance of structural measures, related facilities, and channel systems. Average annual operation and maintenance costs are estimated to be \$639,200.

Local landowners, groups, and villages will install and maintain land treatment measures in accordance with their agreements with the North Cook Soil and Water Conservation District. Land treatment measures will benefit over 12,000 property owners. Installation of the planned structural measures will directly benefit more than 1,200 flood plain property owners in Upper Salt Creek Watershed and provide about 2,800,000 visitor day recreational opportunities. Expanded demand for goods and services will stimulate business activity in the local economy thereby directly and indirectly benefiting a bulk of the watershed's 93,500 population.

Total average annual benefits from structural measures are estimated to be \$3,323,900. Total average annual costs will be \$1,996,100. The benefit-cost ratio including both flood control and recreation is 1.7 to 1.0.

DESCRIPTION OF THE WATERSHED

Physical Data

Upper Salt Creek Watershed is an area of 52 square miles or 33,280 acres located primarily in Cook County with minor areas located in Lake and DuPage Counties. The center of the watershed lies 25 miles northwest of downtown Chicago and lies midway between Elgin and Chicago. Municipalities located partly or wholly within the watershed include Palatine, Rolling Meadows, Schaumburg, Elk Grove, Hoffman Estates, and Inverness. The main branch of Salt Creek which rises near Inverness in the northwest part of the watershed runs 3 miles east thence 2 miles south where it is joined by 2 tributaries flowing from the west. It then flows 2 miles southeast where it is joined by the Arlington Heights Branch, a tributary draining the northeast part of the watershed and rising in the Deer Grove Forest Preserve. The West Branch, which drains the southwest part of the watershed, enters Salt Creek 3 miles to the south near the Cook County line. Salt Creek joins the DesPlaines River approximately 20 miles downstream.

The bedrock surface in the watershed area is mantled by thick deposits of glacial drift consisting primarily of a dense poorly sorted mixture of clay, silt, and rock fragments. Locally there are lenses of sand and gravel deposited by the melting glaciers.

Soils are mostly silty clay loam or silty clay in texture, reflecting the predominantly clay rich glacial deposits. A few areas have silty soils developed from wind and/or water deposited material on top of till.

The area is characterized by typical morainic knob and kettle topography with numerous undrained depressions. The maximum elevation, slightly over 890 feet, is located on the western watershed divide near South Barrington and the minimum elevation, 680 feet, is located at the Upper Salt Creek outlet. The maximum relief is, therefore, 210 feet.

The main stem of Salt Creek flows in a broad sag between the Tinley moraine to the east and the Valparaiso moraine, which dominates most of the watershed, to the west. Masking of the pre-glacial topography by glacial drift has resulted in a poorly integrated drainage pattern with numerous undrained depressions. Well developed stream cut valleys are absent.

Approximately 11 percent (3,780 acres) of the watershed is in woodland cover. It has been determined that 20 percent of the woodland is in very poor hydrologic condition, 4 percent in poor, 11 percent in fair, and 65 percent in good hydrologic condition.

Average annual precipitation for the watershed is 33.18 inches based on a 38-year record from Chicago Midway Airport. Average annual runoff is 8 inches. Average annual snow fall is 31 inches. The mean annual temperature is 50.8 degrees Fahrenheit and the frost-free season averages 165 days.

Economic Data

The watershed is located directly west of the expanding Chicago Metropolitan Area and O'Hare International Airport. Proximity to the airport, expressways, and rail facilities has caused the area's population to grow rapidly. Estimates of past, present, and future population, supplied by the Northeastern Illinois Planning Commission, are listed below:

<u>Year</u>	<u>Population</u>
1965	72,200
1970	93,500
1975	121,000
1985	178,300
1995	224,500

Major changes in land use have accompanied the rapid population growth. Competition for available land resources between industrial and residential uses is reshaping the topography of the area. Large industrial parks now dot the landscape; these combined with the rapidly growing residential and business areas to form further extensions of the metropolitan area.

Estimates of land use and changes in land use were determined from field observations and delineations on aerial photographs in February 1968 and September 1969. Land use was divided into two major categories -- developed and undeveloped land.

The above mentioned studies indicated a 10 percent increase in developed areas during the 18-month period. Estimated future (1990) land use is based on 90 percent of the undeveloped area being developed. Estimates of past, present, and future land use are listed as follows:

	Acres		
	February 1968	September 1969	Future (1990)
<u>Developed</u>			
Residential	9,250	10,150	18,890
Business, industrial, and apartment developments	2,470	2,710	5,040
Forest land (Cook Co., Forest Preserve)	2,860	2,860	2,860
Recreation areas	850	930	1,740
Roads, railroads	1,100	1,210	2,250
Miscellaneous	340	370	690
Subtotal	16,870	18,230	31,470
<u>Undeveloped</u>			
Cropland	13,530	12,200	620
Forest land (Private)	920	920	520
Wetlands	1,960	1,930	670
Subtotal	16,410	15,050	1,810
TOTAL	33,280	33,280	33,280

Developed areas occupy 54.8 percent of the watershed area. Residential areas occupy more than half of the total developed area and vary greatly as to cost and density. An estimated 80-90 percent of the homes are located within incorporated areas having an average density of 3 homes per acre. The remaining homes are located on one acre or larger lots in largely unincorporated areas.

Included in recreation areas are golf courses, parks, and playgrounds. Miscellaneous areas include cemeteries, disposal dumps, quarries, and water surface areas.

Undeveloped areas now occupy 45.2 percent of the watershed area. Cropland is primarily in row crop (corn and soybeans) production. Specialty crops such as fruits, vegetables, and nursery stock are produced on the remaining cropland area.

About 2,860 acres of the forest land are owned by the Forest Preserve District of Cook County and are managed for public recreational and educational use. The remaining forest land (920 acres) is privately owned.

Present stands are central mixed hardwoods and have a high esthetic value. Little or no timber is being harvested at this time.

There is no normal market for forest products; however, exceptional quality veneer logs are occasionally marketed.

Fire protection is provided by rural fire protection districts and is generally adequate. Forest acreage burned in the last 10-year period is negligible.

With the exception of the Ned Brown Forest Preserve most lands in the flood plain are privately owned. There are flood plains in Elk Grove Village and Rolling Meadows which are publicly owned and include school and church playgrounds and parking areas, parks, and other public recreation facilities. Approximately 111 farms exist today. This number is decreasing at a rapid rate. The average size of farm is approximately 134 acres. Farm population or rural population is approximately 555 persons. All land in the area sells as potential urban development land. Land values now vary from about \$5,000 per acre for undeveloped land to \$55,000 per acre for land within areas zoned for business and industrial use.

Farms within the area are accessible to roads and markets. However, markets in the Upper Salt Creek Watershed are nonexistent with most markets being 30 to 40 miles in distance. Urban development has forced out existing farm markets. Most farmers in the area seek off-farm employment during off-farming season. Virtually no livestock is raised in the watershed with the exception of horses.

The major center of employment for residents of the watershed is the city of Chicago. Based on statistics for Cook County (1970), 36.5 percent of the families have incomes exceeding \$10,000 per year. The rate of unemployment (1970) is 2.5 percent, or some 83,000 people out of the 3,340,000 civilian work force in the Chicago area.

Land Treatment Data

Extensive studies within the watershed show that urbanization is occurring at the rate of approximately 100 acres per month. This is occurring in both upland and flood plain areas. As this development occurs, erosion and sediment control measures are not being applied. Most extensive practice needs include critical area seeding and stabilization. Other practices are needed in lesser amounts, and these include debris basins, sod waterways, and diversions. Drainage mains and laterals, drainage field ditches, and drains are needed to provide relief from localized flooding in presently developed urban areas.

Installation of conservation practices on cropland is important to the project but by the end of the project period, cropland will

amount to only 16 percent of the total watershed area. Major conservation needs of cropland areas include minimum tillage, sod waterways, and conservation cropping systems.

Woodland areas within the watershed area will have practices including recreation area improvement, recreation area stabilization, and additional tree planting in open areas, most of which occur upon Cook County Forest Preserve lands. Recreation area improvement and stabilization will occur around structures 2, 3, 4, 5, and 6, and are not included in project cost share for recreation under PL-566.

Current state cooperative programs available in the watershed include Cooperative Forest Management and Cooperative Forestation.

Land capability class within the watershed is predominantly Class I and II, with small areas of Class III. Problem areas for all land uses occur on the Class II and III lands.

The North Cook Soil and Water Conservation District has been providing assistance to the many urban land users in this watershed. There are 34 cooperators with 21 conservation plans. These are individual cooperator agreements and cooperator agreements with villages.

Presently the soil and water conservation district is working closely with village officials with efforts directed toward ordinances controlling sedimentation and runoff. Technical assistance on soils and engineering has been provided to the cooperators and other land users in this watershed to help guide them in directing the rapidly changing land use in this watershed. For example, the village of Hoffman Estates has installed several small floodwater storage structures to control flood runoff within the village.

Due to the temporary conditions under which farming operations are carried out within the watershed, application of permanent-type practices on farm land is limited. Therefore, it is evident that during the proposed project period, the most intensive land treatment problems will occur on the acres of land projected to change to other land use.

Fish and Wildlife Resource Data

There is still considerable wildlife habitat in the watershed although it is rapidly being depleted by urban and industrial development. Approximately 1,930 acres of wetlands remaining are of particular value as wildlife habitat. It is estimated that these wetland areas will shrink to 670 acres by 1990. Other areas providing food and cover for wildlife are cropland, grassland, woodland, and stream bank vegetation. Smaller habitats of greatest benefit to songbirds are yards and estates, rights-of-way, cemeteries, and parks.

Major utilization and enjoyment of wildlife is by naturalists, birdwatchers, nature photographers, and other such nonconsumptive uses. Hunting is greatly restricted or nonexistent due to urbanization and human population pressures.

The watershed has fair to good population of pheasants, rabbits, mourning doves, squirrels, and songbirds. Deer are present in limited numbers.

Mink, muskrats, and raccoons are the common furbearers found on the watershed. The remaining small potholes and marshes provide good habitat for these species.

Waterfowl, especially mallards, teal, and wood ducks, utilize the wetland areas. Some nesting by ducks undoubtedly occurs although most use is by migrating birds.

Fish habitat consists of 10 lakes over 6 acres in size and approximately 25 miles of streams. Both types of habitat contain only mediocre fish populations. Principal species harvested by anglers are green sunfish, black bullheads, carp, goldfish, and bluegills. Other species found in the streams include suckers and minnows. Fishing use is low because of the generally poor quality of fish habitat and fish populations, and poor accessibility of fishing spots and absence of public areas.

WATERSHED PROBLEMS

Floodwater Damage

Flooding in Upper Salt Creek and its major tributaries is increasing at an alarming rate. This increase can be attributed to a combination of several factors. (1) During the urbanization process many swamps and depressional areas are drained and storm sewered into the main channels. (2) As rooftops, streets, and parking lots replace cropland, pasture, and woods, the rate and volume of rainfall which runs off the land increases. (3) Obstructions such as road fills and land fills across the natural floodways obstruct flood flows and increase floodwater elevations. (4) Uncoordinated channel improvement in several areas has accelerated flood flows and as a result increased flooding in downstream areas. (5) Sedimentation of channels caused by urban construction is increasing flood stages. These physical changes in the watershed have increased the frequency at which flooding occurs.

In June 1967, the U. S. Geological Survey stream flow gauge located where Golf Road crosses Salt Creek recorded the highest flow of its 20-year record. This same storm also left record high-water marks at many other locations within the watershed. However, when this flood is compared with the May 1960 flood which was the

previous record, the effects of the 4 flood-inducing factors mentioned above is clear. The total flood volume which passed by the gauge in 1960 was 1.3 times greater than the 1967 flood but the 1967 peak flood flow was 1.5 times greater than the peak 1960 flood flow. The maximum flood stage was 0.8 feet higher in 1967 than it was in 1960.

It is estimated that the June 1967 flood has a recurrence frequency of once every ten years. This flood caused an estimated \$926,600 damage in 1967. However, it is estimated that if the same rainfall occurred in 20 years, the damages would increase to \$1,812,400.

Flooding of the 1,200 existing residences within the flood plain was broken into three general categories. The first is basement and lower level flooding caused by submerged storm sewer discharge points and floodwater entrance into the sanitary sewer system through flooded street manholes. Although this flooding is usually shallow the water is polluted and extremely damaging. Damages are characterized by water damage to appliances, furnishings, interiors, and personal property. Cleanup expenses are extremely high for this type of flooding. It is estimated that about 65 percent of the existing residences within the flood plain experience this type of damage due to main stream flooding.

The second is direct entrance of surface floodwaters into lower level garages, basements, and subground surface living areas. The floodwater usually rises very rapidly and reaches depths from 3 to 5 feet. Damages from this type of flooding are similar to those experienced in sewer backup flooding except the increased depth and rapid rise of water increases the damages to furnishings, appliances, and personal property. In addition, some structural damage is sometimes experienced. This includes such items as basement windows, walls, wiring, and heating plants. An estimated 30 percent of the residences are subject to this type of flooding.

The third and most infrequent type of flooding is characterized by inundation of the frame portions of the structure. Damages from this type of flooding include major structural damage to floors, floor joists, carpeting, furniture, and other high value personal property normally found in the main living area of a home. An estimated 5 percent of the flood plain homes are presently vulnerable to this type of flooding.

The present home and apartment buildup in the flood plain will suffer an estimated direct damage of \$304,600 annually without project action.

Parking areas and playgrounds of three grade schools and two churches are also located within the without-project flood plain area. School closures and cleanup expenses are expected to cost an average of \$1,500 annually.

Flooding of major highways and local roads, a major source of indirect damage, is characterized by low velocity, relatively short duration flooding. However, the frequency of this flooding and the fact that roads must be closed during inundation results in a problem of major proportions for this commuter-oriented area. Expenses from increased travel distance, travel delays, and increased safety hazards are estimated to average \$44,900 annually.

In addition to traffic interruptions, single houses and groups of houses are often isolated during flood periods. This isolation impedes the movement of emergency vehicles and thereby poses a threat to the health and safety of individuals so isolated.

Other indirect floodwater damages include neighborhood degradation, reduced quality of the living area within each residence, and reduced structure life. These types of indirect damages over the presently built-up area are estimated to average \$61,300 annually; total indirect damages are \$106,200.

The June 1967 flood inundated an estimated 1,000 residences causing an estimated \$654,900 damages. Commercial and other urban damages were estimated at \$117,300. Indirect damages were estimated to be \$154,400. The total damage from this single historical event was estimated to be \$926,600.

Projected future flood plain buildup will result in increased average annual damages. The following table summarizes present and projected floodwater damages.

AVERAGE ANNUAL FLOOD DAMAGES

Dollars			
<u>Items</u>	<u>Present Buildup</u>	<u>Future Buildup</u>	<u>Total</u>
Direct damage			
Floodwater			
Residential	304,600	269,200	573,800
Commercial	300	98,200	98,500
Other urban	1,500	---	1,500
Indirect damage	106,200	73,500	179,700
TOTAL DAMAGES	412,600	440,900	853,500

Sediment Damage

Sediment damage in the watershed is generally relatively slight in comparison with that caused by floodwater. Presently there are no major impoundments in the watershed to be damaged by sediment encroachment reduction in storage capacity. However, there are numerous small natural water bodies which are being filled with sediment at an accelerated rate due to excessive erosion in their drainage areas. Local flooding is aggravated by the filling of road ditches with sediment which also results in increased maintenance costs. Sediment remaining in buildings after floodwaters recede is damaging. However, the cost of sediment cleanup is generally accounted for as a part of floodwater damage and is not estimated separately.

The current use of groundwater for municipal supply in the watershed precludes damages caused by high treatment costs due to excessive turbidity or suspended sediment. However, excessive turbidity will increase the operating and maintenance costs of any groundwater recharge facilities which might be contemplated in the future for areas adjacent to Salt Creek. High levels of turbidity also detract from the esthetic quality of water and in that sense are damaging.

Erosion Damage

Serious erosion is occurring in the watershed as a result of construction. Industrial, residential, and highway construction sites are cleared and remain devoid of effective soil protecting vegetation for a period of from 6 months to 2 years. Average annual soil loss at these sites is estimated to be 70 tons per acre for the duration of construction activity while soil loss on well managed agricultural land in the watershed is estimated to average less than 3 tons per acre annually. The problem of erosion will be most serious during the initial 20 years of the project life as full development of the watershed area proceeds with its associated construction activity. Erosion on developed land ceases to be a problem as pavements are placed and vegetation is established. Soil loss from developed land in the watershed area is estimated to be 0.25 tons per acre annually. Soil loss from existing forest preserve areas will be negligible.

Problems Relating to Water Management

Drainage

Approximately 24,000 acres of gently rolling to flat upland area is characterized by knob and kettle topography with numerous depressional areas that have both surface and subsurface drainage problems. The upland water courses have relatively flat gradients.

The soils in the water courses consist of black, soft, organic clay and silt underlain by firm glacial till. Many of the potholes have, at one time, been tile drained for agricultural use. These tiles have served their life time of usefulness. Many of them have been severed as urbanization has occurred, causing an increase in flood and drainage problems in the pothole areas. Much of this water problem is occurring after construction of homes has taken place in the lowland areas. The primary area where these conditions exist are in and around the villages of Palatine and Rolling Meadows. The village of Rolling Meadows has developed the area subject to flooding and poor drainage along Salt Creek as a park. This use reduces the need for extensive improvements for drainage and flood prevention.

Local people have formed into groups and are attempting to solve these local drainage problems through their city and township governments. In some cases success has been achieved; in many others, the problem still exists. As buildup continues in this urban area, these problems will be aggravated.

Since many existing areas of farmland have this same type of topography, as development of these areas takes place it can be expected that drainage in the low pothole areas will deteriorate.

Municipal and Industrial Water

The villages of Palatine, Rolling Meadows, Elk Grove, and Schaumburg receive water from municipally-owned wells with a total maximum capacity of 11.0 million gallons per day. The village of Inverness depends entirely upon private wells for its water supply. In all cases, the available groundwater supplies are more than adequate for present and future (1995) needs of an expected population in excess of 220,000.

Recreation

Demand for recreation land and facilities within and surrounding Upper Salt Creek Watershed becomes a little greater each day as new housing and industrial developments continue their rapid expansion. Nowhere in Illinois is the need for outdoor recreation so acute as in this metropolitan area. Over 6 million people live within a 25-mile radius of the watershed. The expected rapid growth in population, per capita income, leisure time, and ease of travel will all contribute to a tremendous growth in the future demand for recreation.

Most of the present recreation land within the watershed is provided by the Cook County Forest Preserve District, neighborhood parks, and by the public and private golf courses. The Arlington Heights Race Track is also located within the watershed. The forest preserves at present provide little water-based recreation. Exist-

ing water areas are very shallow or marshy. The principal uses made of the forest preserves are for hiking, picnicking, playgrounds, and nature study.

Fish and Wildlife

Wildlife habitat, both upland and wetland, is being destroyed by urban and industrial development.

Public fishing waters are limited in number. They are small, relatively shallow, difficult to manage, and have habitat limitations which make development of desirable fish populations difficult.

Streams are polluted by sewage effluents, storm water drainage, and sediment from construction projects, which result in poor water quality, mediocre fish populations, and lack of esthetic appeal which reduces their recreational potential.

Water Quality

Water quality in Salt Creek is adversely affected by discharges from sewage treatment plants, overflows from combined sanitary and storm sewers in Palatine, sediment carried in suspension and discharges from malfunctioning private septic fields located mainly in unincorporated areas outside of village limits. The total number of these systems is not known. The major developed unsewered area is the village of Inverness, an area of high value homes with lot sizes of 1 to 2 acres. Septic filter fields usually function satisfactorily on lots of this size except during abnormally wet periods. The Cook County Health Department has reported that complaints in this area are relatively infrequent.

The total pollution load on Salt Creek degrades the quality of life in adjacent areas and creates local public health problems. Data for 1971 and 1972 from Illinois EPA sampling station GL-06, located on Salt Creek 1.4 miles downstream from the Ned Brown Preserve, approximates current water quality conditions in the watershed. The respective average fecal coliform counts for these two years are 3565 and 1413 per 100 ml. The respective averages for dissolved oxygen are 5.7 and 8.5 mg/l. It is not possible to directly compare the preceding data with the State General Standards for dissolved oxygen and fecal coliform due to the manner in which these standards are defined. However, comparisons can be made for phosphorus, pH, and ammonia nitrogen. The two year mean for phosphorus of 0.128 mg/l exceeds the State standards of 0.05 mg/l by 0.078 mg/l. The values for ammonia nitrogen and pH fall within State standard acceptable respective values of 1.5 mg/l and 6.5-9.0.

The Metropolitan Sanitary District is at present carrying out a program to improve the quality of water within Upper Salt Creek Watershed. The program includes collecting all sanitary sewer lines, leading them to specific locations, and providing adequate treatment.

Construction of a sewage treatment plant on the West Branch just east of Interstate 90 is in progress. This plant will treat all sanitary effluent produced in the Upper Salt Creek Watershed and discharge downstream from structure 1. In areas where storm water and effluent mix during flood times, even the storm water will be treated. This new facility will improve the water quality and recreation potential of all water bodies within the watershed.

PROJECTS OF OTHER AGENCIES

The State of Illinois, Department of Transportation, Division of Water Resource Management, is authorized to make surveys and prepare master plans and make expenditure of funds for alleviation of flooding in the entire Salt Creek Watershed. The Division prepared a plan in 1955 for flood control and drainage improvements along the main stream of Salt Creek from its outlet into the Des Plaines River for a distance of about 36.8 stream miles to a point in the vicinity of Palatine. The Division's plan for flood control and drainage development considered water control, pollution abatement, recreational development, and effect of drainage improvement upon groundwater levels.

Improvements on the Arlington Heights Branch

The Division of Water Resource Management recommended that a 4-stage improvement program be initiated on the Arlington Heights Branch from its mouth at Salt Creek upstream to a point approximately 2,000 feet north of Palatine Road, a distance of about 26,000 feet. The channel has a bottom width which varies from 19 feet to 35 feet and side slopes of both 2 to 1 and 3 to 1.

Stage 1 from the confluence with Salt Creek to Euclid Avenue in Rolling Meadows, a distance of 9,775 feet is completed. It included channel improvement, bridge construction, and revegetation.

Stage 2 consisted of the construction of a new box culvert structure under the Chicago and Northwestern Railroad and the construction of a new twin box culvert under the service road within Arlington Park Race Track and 932 feet of channel improvements between the two structures.

Stage 3 will complete the unimproved 3,130 foot section of the channel between Stages 1 and 2 and consists of channel excavation, relocation of well and pump stations, relocation of water main relief stations, and construction of twin box culverts under the service road within Arlington Park Race Track.

Stage 4 includes 11,910 feet of channel improvement. The reach from the Chicago and Northwestern Railroad culvert to Route 53, a distance of 1,681 feet, was completed at the time of construction of Route 53.

Improvements Downstream from Structure 1

Channel improvement is planned through most reaches of Salt Creek downstream from structure 1. To date land rights have been acquired on 7.4 miles of channel and construction has been completed on 6.5 miles. The Division of Water Resource Management is proceeding with right-of-way acquisition and construction as funds become available.

This plan was coordinated with the Division of Water Resource Management's plan. The two plans compliment each other and provide system benefits over and above what each would do alone; however, the installation of this plan is not dependent on the Division of Water Resource Management's Plan being in place.

PROJECT FORMULATION

The people of Upper Salt Creek Watershed recognize the need for a comprehensive approach to the solution of watershed problems. The Sponsoring Local Organizations and the Service agreed to the following specific objectives:

(1) Reduce erosion and increase rainfall infiltration by establishing land treatment measures which contribute directly to watershed protection and flood prevention.

(2) Attain a reduction of 85 to 90 percent in average annual floodwater damages in urban areas with consideration given to the 100-year frequency storm.

(3) Include recreation water in structure 1 and increase maximum design capacity of associated recreation facilities for public use which would include a wide range of recreational activities because of the tremendous pressure from the metropolitan area.

(4) Include water resource improvement for recreation and/or wildlife in all suitable areas in order to improve the local environment and make the watershed a more esthetically desirable place in which to live.

The development of a high quality urban environment with a minimum of land use conversion problems was considered. Soils maps and interpretative descriptions have been prepared under the National Cooperative Soil Survey Program. An accelerated program for disseminating this information is included in the project since use of this information by planning commissions, village governments, and developers is considered essential. Use of this information during the urbanization process will reduce maintenance expenses, often reduce construction costs, and provide a higher quality community.

Floodwater damage is a serious problem in the flood plain areas of Upper Salt Creek. The preliminary investigation indicated several alternative solutions to this problem. It was agreed by the Service and the Local Sponsoring Organizations that floodwater storage was the most acceptable means of reducing these damages. It was also agreed that undeveloped flood plain areas should never be allowed to develop. It was recognized that channel improvement might be needed to provide the desired protection in selected areas.

The Metropolitan Sanitary District of Greater Chicago has amended its sewer permit ordinance to require all new development plans to include storm water detention facilities for each new development having capacity to retain the 100-year storm runoff. This unique approach was necessary in order to offset the effects of increasing storm sewer discharges in many small subwatershed areas.

The Sponsors, working with the Service, selected a system of floodwater retarding structures to provide the highest feasible degree of flood protection. The watershed topography and numerous urban developments drastically limited the number of possibilities for structure locations. However, the interrelated storage capacities and floodwater release rates of the various structures were studied in an effort to minimize costs and maximize system benefits.

It was agreed that the two remaining undeveloped flood plain areas were to be placed in public ownership in order to prevent future development and the resulting damage. This method of damage prevention is the most feasible method of protecting these areas.

After all available detention sites were fully utilized and available valley storage preserved, it was determined that channel improvement is necessary on the main stem of Salt Creek between Rohlwing Road and Golf Road (Reach F). This channel improvement is required to protect numerous existing developments in this area.

Watershed damage evaluation with and without project included storm runoff events up to and including the 100-year flood. It was agreed that the goal of the project measures would be to eliminate all damages from the 100-year evaluation storm. It was also agreed that where it was not feasible to eliminate damages from the 100-year storm with above mentioned project measures, flood profiles and maps must clearly indicate the elevation and extent of the remaining flood hazard.

In addition to an annual publication of flood hazard information, it was agreed that (1) enforcement of existing ordinances against new developments in identified flood hazard areas and (2) enactment of a technical assistance program to provide flood proofing information to owners of existing properties with a flood hazard is necessary.

It was agreed that in order to perpetuate the effects of the flood prevention measures, local public agencies must assume the responsibility for maintaining the with-project channel or its equivalent in all evaluated areas within Upper Salt Creek Watershed. It was agreed that where these channels lay within village limits, the villages would assume this responsibility. Where the channels lay outside village limits, the county would assume this "watchdog" responsibility.

It was agreed that due to critical shortage of recreation facilities within the watershed and the projected population increase, all lands acquired for flood prevention purposes should be rededicated to a joint recreational use upon completion of construction. The Metropolitan Sanitary District of Greater Chicago will lease the land and water area required for flood prevention to local governmental agencies for their development and operation and maintenance as recreational facilities. Development and operation responsibilities include providing adequate sanitary and safety facilities, insuring adequate water quality, and adhering to state and local health regulations. The Schaumburg Park District will operate site 3; and the Palatine Park District will operate sites 2, 5, 6, and the west side of 4; the Salt Creek Rural Park District will operate the east side of site 4. Water resource improvement for non-project recreation facilities will be included in the development of sites 2 and 3.

Recreational development of these small pool and land areas, will necessarily be limited. However, activities such as picnicking, fishing, nature study, ice skating, and tobogganing can be carried out at these sites, thereby partially meeting the critical recreation needs of the area.

Structure 1 has long been identified as a potential multiple-purpose (flood water retarding and recreation) development site by the Cook County Forest Preserve District. The State of Illinois agreed that this site be developed to its maximum potential. Recreational facilities to be added to the existing development will provide for picnicking, boating (sailboat, rowboat, canoe), fishing (boat and shore), bicycling, hiking, nature study, model airplane flying, kite flying, field games, (baseball, volleyball, etc.), tobogganing, sledding, skiing, snowmobiling, ice skating, ice fishing, and day camping. Activities of this nature are especially suited to the urban population which surrounds this site. Approximately 6,000,000 people live within a 25-mile radius.

The Metropolitan Sanitary District of Greater Chicago is carrying out a vigorous campaign against surface water pollution in Salt Creek. This campaign includes complete separation of storm water and sanitary flows where practicable, treatment of polluted storm water where separation is not practicable, and ultimately, complete and adequate treatment of all domestic and

industrial wastes within the Cook County portions of Upper Salt Creek Watershed. Therefore, the present marginal water quality condition is expected to improve in the immediate future.

However, in the interim period short periods of high pollution concentrations could endanger fish populations along the main stem of Upper Salt Creek. Therefore, lateral impoundments were considered as a practical means of protecting the fish populations in structure 1 against total kill.

Busse Forest Nature Preserve, a part of the Illinois Nature Preserves System, is located on the east side of Salt Creek near the upper end of the structure 1 reservoir. The Recreation Development Map shows details of location and relationship of wooded areas to permanent and temporary pools. The preserve consists principally of natural woodland. On the west side of the woods, between it and Salt Creek, is an area of open grassland. This grassland area was formerly under cultivation and its principal function is to serve as a buffer area for the protection of the woodland. The Illinois Nature Preserves Commission indicated that alteration of the grassland by the reservoir project would probably not be inconsistent with the purpose of the nature preserve but that it was concerned that the project not impair or disturb the natural woodland.

Subsequent studies and discussion by the Commission staff, the Illinois Department of Conservation, Soil Conservation Service, and Cook County Forest Preserve resulted in the following agreements: (1) No clearing of trees will be done within the nature preserve except for trees on the present stream bank. (2) Preceding installation of structure 1 the Cook County Forest Preserve District will install approximately 1,500 feet of low earth levees to prevent floodwater from entering the north end and the southwest corner of the preserve. This will involve construction of about 900 feet of levee one foot in height, 300 feet of levee two feet in height, and 300 feet of levee three feet in height. Three flood-gated culverts 16 feet in length and one foot in diameter will be installed through the levees. (3) The Illinois Nature Preserves Commission and the Cook County Forest Preserve District will jointly monitor the effects of structure 1 after it is installed to determine if flooding or sedimentation is significantly altering the natural woodland. (4) In the event that installation of structure 1 causes any impairment or disturbance of the natural woodland by erosion flooding, and/or sedimentation, the Forest Preserve will install necessary control measures to reduce the adverse effects. These measures could include channel bank stabilization, low earth levees, and sediment traps.

Four alternatives were considered to the project:

- (1) Land treatment alone, without the proposed structural measures would greatly reduce the erosion and sedimentation problems, but would reduce floodwater damages only about two percent. This is not acceptable. Residents of the watershed desire greater flood protection.
- (2) Additional channel improvement and decreased retarding capacity would be an alternative to the proposed action. However, the channels would necessarily be very large and require paved linings. This is unacceptable from cost and esthetic standpoints.
- (3) Another alternative would be additional floodwater storage and decreased channel improvement. This alternative is unacceptable since the proposed project provides for maximum development of all available storage sites in the watershed.
- (4) Flood plain zoning, in addition to the 261 acres of flood plain dedication included in the project, is also an alternative. However, the remaining flood plain land is intensely developed or committed to development. Therefore, zoning of these areas for less intense use is precluded as a reasonable alternative for this area.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures

Land treatment measures to be installed will be based on using each acre within its capabilities and treating it in accordance with its needs. Such a program is now being carried out by the North Cook County Soil and Water Conservation District. Emphasis will be placed on accelerating the establishment of land treatment practices which have a significant effect on the reduction of erosion and floodwater damages.

An estimated 22 conservation and resource management plans will be prepared during the installation period. Resource plans will represent a record of management decisions for land use within village limits affecting approximately 17,000 acres or one-half of the watershed area. Resource conservation plans will also be developed for units of government owning land, such as the Cook County Forest Preserve and five park districts. These plans will represent an additional 4,000 acres. Additional resource conservation plans will be developed with private land owners on 1,000 acres of agricultural land.

Cropland subject to erosion will be protected by the use of minimum tillage, development of grass waterways, and conservation cropping systems. Land treatment will be carried out through the development of conservation plans in accordance with local work unit technical guides.

Forestry land treatment practices should be applied to provide protection for planned flood control structures and to improve the local environment. Forest management plans should provide for fire protection, livestock exclusion, thinning, cultural and sanitation work, needed tree planting and interplanting, harvest cutting, and wildlife needs. The forestry program shown in Table 1 was developed for private lands by the Illinois Department of Conservation, Division of Forestry, and the U. S. Forest Service as determined by a field survey of the watershed. To provide for proper installation and maintenance of approved measures on private land, individual management and planting plans are needed for approximately 10 landowners involving 20 acres. This service, together with other technical assistance to landowners, would insure that the watershed values are not impaired.

The Illinois Department of Conservation, Division of Forestry, will provide, upon request, additional technical assistance in forest land use planning and zoning to planning commissions, sanitary sewer districts, highway commissions, leaders of local communities, land developers, and private landowners. Assistance of this type is needed to retain the maximum amount of forest cover for the benefit of the community, forest buffer zones, infiltration zones, and sediment trapping zones. The Forest Preserve District will install measures on their land as a need develops.

Land treatment on the upland urban development areas will be accomplished in this watershed by working with the seven major governmental bodies who have authority over land use in the watershed. These governmental bodies are the villages of Palatine, Inverness, Rolling Meadows, Schaumburg, Hoffman Estates, Elk Grove, and the County of Cook. These villages are or will be cooperators with the North Cook Soil and Water Conservation District.

Resource management plans for other lands will be developed with villages to provide a basis for timely installation of land treatment measures and the enactment of ordinances by all villages which are so vital to the accomplishment of the land treatment program within this watershed. Emphasis will be placed on improvement of proper land use and treatment of land needs in two major areas: (1) upland areas -- where erosion is caused by new developments, pollution is caused by poorly located septic filter fields, and localized flooding occurs as a result of the lack of provision for disposal of floodwater; (2) flood plain areas -- where flood damages are increasing because of continued development.

Technical assistance will be provided to developers for on-site development of plans to minimize erosion and sediment and to meet the sediment and erosion control ordinances to be carried out by the villages. Practices which will be used on miscellaneous land by developers will include debris basins, waterways, diversions, critical area seeding, and floodwater retention structures.

Poorly drained areas in existing and proposed urban development areas will be improved through the use of drainage mains and lateral drainage field ditches and drains where needed. These will be installed where localized urban flooding is anticipated or presently occurs. Installation of these drainage measures in the urban areas will be limited to Class I and Class II wetlands.

The land treatment program will be intensified in the evaluated flood plain areas and will be accomplished by (1) providing guidance through resource conservation plans for land use within the evaluated flood plain area; (2) providing guidance to villages in carrying out flood plain ordinances; (3) preparing handout material containing sound but practical floodproofing measures applicable in Upper Salt Creek; (4) informing individuals who are within the with project flood plain of the potential flood hazard; and (5) proposing suitable floodproofing measures which these individuals can install to reduce or eliminate the damage potential. It is estimated that of the 240 homes within the with project flood plain, 50 of them will install floodproofing measures during the nine-year installation period.

Acres to be treated and estimated cost for the nine-year installation period are shown in Table 1.

The enactment of ordinances by all villages within the watershed project are vital to the land treatment program. For this purpose a model ordinance has been developed in the northeastern Illinois area and will serve as a guide for each village to develop its own ordinance. Work unit technical guides in Illinois were modified February 1972 to meet the needs of sediment and erosion control ordinances.

Wildlife wetland habitat development in other land will be applied to enhance the wildlife resources. Such development will consist essentially of establishing, maintaining, and preserving shallow wetland areas suitable for protection and propagation of waterfowl and furbearers. Practices beneficial to wildlife such as protected grass seedings and field or area borders will be included in resource management plans for areas devoted to nature study and birdwatching.

Structural Measures

Five single purpose floodwater retarding structures (2, 3, 4, 5, and 6), will be installed upstream from multi-purpose structure 1. Locations are shown on the project map. These 6 structures are designed to provide protection from a storm having a 1 percent chance of occurrence. Sediment retention capacities and structural materials are designed to give the structures an effective life of 100 years. Structures 1, 2, and 3 will be earth fill floodwater retarding structures with drain valves, conduits and inlet appurtenances. Structures 4, 5, and 6 will be excavated storage pump discharge floodwater retarding structures with diversion inlets.

Foundation materials at the floodwater retarding sites consist of Wisconsinan till foundation with a layer of alluvium covering the low lying areas. At the fill sites for structures 1, 2, and 3, alluvium ranges from 10 to 20 feet deep. However, this material has a low permeability and therefore with adequate drainage and staged construction, this material will not cause an unstable condition. The pit reservoirs are excavated entirely in Wisconsinan till interspersed with small lenses of sand and gravel. While these lenses are saturated under normal conditions, they are not extensive. Therefore, preconstruction drainage by the use of well points, should minimize the importance of these lenses.

An abundance of Wisconsinan till provides an excellent source of high quality earth fill material for structures 1, 2, and 3. The emergency spillway excavations may be used as fill material as well as other suitable borrow materials within the flood pool areas. Fill heights on structures 1, 2, and 3 range from 22 to 25 feet. The 2-valley-fill and 3 excavated-pump structures will temporarily detain runoff from 20.6 square miles representing 41 percent of the total drainage area upstream from structure 1. A total of 1,500 acres of land will be covered by the flood pools of these 6 structures. The permanent pools, including areas reserved for sediment and recreation, will cover 649 acres. Construction and borrow areas will require another 208 acres.

The 6 structures, including multiple-purpose structure 1, will have a total combined storage capacity of 9,554 acre-feet. Total floodwater detention capacity will be 6,467 acre-feet. The sediment storage volume of 568 acre-feet will be adequate for an estimated 100-year accumulation. Floodwater detention capacity, expressed in inches of runoff from the drainage area of the structures, is 2.4 inches. An additional 2,519 acre-feet of recreation water will be provided in structure 1. Relocation costs are expected to occur in conjunction with structure 1 only.

A preliminary review of the six structure locations conducted by the Illinois Archeological Survey indicated one potential archeological site in the vicinity of the structures. This site, which

lies in the flood pool and recreation development area of structure 1, will be investigated by the Survey prior to final construction. In addition, a detailed archeological reconnaissance of each site will be conducted prior to construction. The National Park Service and the Illinois Archeological Survey will be kept informed of progress in the project. In the event that archeological materials are uncovered during construction, the Survey will be contacted for possible salvage.

All permanent pools will be stocked with fish at stocking rates and species composition to be recommended by Illinois Division of Fisheries.

Multiple-Purpose Recreation Development Structure 1

Dam and Dredging

Multiple-purpose structure 1 (50.35 square mile drainage area) will provide 4,210 acre-feet of floodwater detention, 307 acre-feet of sediment, and 2,519 acre-feet of recreation water storage. The flood pool, dam site, and construction areas will utilize an estimated 1,400 acres. The principal spillway will be rounded trapezoidal-weir box inlet with a 9.5 foot overfall. The weir portion of the principal spillway will measure 16 feet by 30 feet. The outlet will use a S.A.F. stilling basin for energy dissipation. The maximum designed discharge of the principal spillway is 2,650 c.f.s. This flow could be expected during a storm with a 1 percent chance of occurrence.

Vegetated emergency spillways with 350 foot bottom widths will be provided around both ends of the dam. The design velocity in the exit channel is 8 feet per second with a maximum stage of 3.5 feet. Since a prolonged flow of water could pass through the emergency spillways during exceedingly large flood events, concrete control sections will be provided.

The permanent pool of this reservoir will be divided into one main pool at elevation 686 and two lateral pools at elevation 688. Permanent water will inundate 589 acres and provide a shore line of 20.4 miles. The total volume of permanent water will be 2,803 acre-feet. However, to attain the recreation volume and water depths suitable for development of recreation, 1,469 acre-feet will have to be provided by dredging. The two lateral impoundments are elevated two feet above the main pool in order to reduce the total amount of excavation required and still provide the desired quality and quantity of recreation water.

Dredged material will be deposited into two specified areas. One area is identified as the winter sports hill area on the recreation development map. This area is already above elevation 694.5. An estimated 1,200 acre-feet will be deposited here. The second area is directly north of the recreation area development and the Northwest Tollway. This area is above elevation 691.0 but below 694.5. Approximately 340 acre-feet of dredged material will be spread over a 170-acre area. Disposal in these areas is the least costly means of constructing structure 1.

Principal utility modifications required by the installation of structure 1 will involve utility lines paralleling Golf Road on the north and Higgins Road running laterally east and west across the center of the reservoir. Preliminary studies of these utilities indicate modifications of 2 buried cables and 4 pipelines will be necessary. All highways crossing and adjacent to the reservoir will be elevated above elevation 694.5. The highway work is presently planned and will be completed prior to construction of the dam.

Installation of structure 1 will result in the displacement of about 700 persons and one business. A trailer court with about 170 owner-occupied mobile homes and homesite rental units will be acquired as part of the land rights. A grocery business will be displaced as part of the trailer court operation. Three families occupying rental apartments over the grocery store will also be displaced.

Detailed landright maps for structure 1 are being prepared with assistance from the Division of Water Resource Management. It is estimated that temporary construction disposal easements on the 170 acres north of the Ned Brown Forest Preserve will cost \$204,000. Minor utility relocations and modifications will cost an estimated \$220,000. These estimates reflect experience for similar work in the metropolitan area.

The Cook County Forest Preserve District will provide the balance of land required for the installation of structure 1 and the associated water-based recreation facilities. This contribution is equivalent to \$11,000,000 in land acquisition. The Forest Preserve District is also providing the existing facilities, non-water-based facilities, and associated land.

Special care will be taken to see that no clearing of trees will be done within the Busse Forest Nature Preserve except for trees on the present stream bank.

Recreation Facilities

Multiple-purpose site 1 lies within a 3,600-acre forest preserve with existing land-based facilities. Therefore, an excellent opportunity exists for development of a water-based recreational development with additional non-water-based facilities being provided to round out the total facility.

Approximately 2,200 acres will be provided for recreation facilities. The water-based facilities will include asphalt-paved parking areas and access drives, picnic shelters, comfort stations, boat launching ramps, trails, nature trails, fishing walls, picnic tables, and boat dock. Special features of the comfort stations include flush-type toilets with electric lights, ventilation, and running water for the lavatories. The reservoir will be stocked with suitable game fish and areas for undisturbed fishing will be developed through a reservoir zoning plan.

The non-water-based facilities to be installed include a winter sports complex with warming shelter, toboggan slides, and ski and sled areas, and an elk pasture. To service these facilities, paved parking areas and an additional comfort station will be provided. The existing parking areas and picnic grounds will be utilized and incorporated into the total development.

The proposed recreational development area is readily accessible from improved roads surrounding the site. The Northwest Tollway along with Golf Road bounds the area on the north while Interstate Route 90 -- Illinois Route 53, is along the west boundary. Arlington Heights Road and Cosman Road provide the east and south boundaries of the development.

Planned water-based facilities to be included in the development are listed in Table 2B. Locations of all proposed facilities are shown on the recreational development map. The recreational facilities plans, designs, and cost estimates were provided by the Cook County Forest Preserve. The following table summarizes the existing facilities and facilities to be installed which will make up the recreation area around structure 1.

<u>Facility</u>	<u>Existing Facilities</u>	<u>Facilities to Be Installed</u>		<u>Total</u>
		<u>Water-Based</u>	<u>Non-Water-Based</u>	
Parking (auto)	1,240	3,270	520	5,030
Boat Rental Dock	--	1	--	1
Boat Launch	--	2	--	2
Auto & Boat Trailer Parking	--	100	--	100
Concession & Service Bldg	--	1	--	1
Picnic Shelters	3	19	--	22
Comfort Stations	--	20	1	21
Wells	13	36	--	49

Facility	Existing Facilities	Facilities to Be Installed		Total
		Water-Based	Non-Water-Based	
Picnic Tables	1,245	3,640	--	4,885
Fishing Walls	--	6	--	6
Trails (Miles)	--	10	--	10
Nature Trails (Feet)	--	8,000	--	8,000
Elk Pasture	1	--	--	1
Skiing and Sledding Hill	--	--	1	1
Toboggan Slide	--	--	1	1
Warming Shelter	--	--	1	1

The recreation body of water will be formed in three distinct pool areas with 2 pool elevations. It will be necessary to excavate most areas to make them suitable for recreation and wildlife development. The following table summarizes the recreation pool data:

	Surface Elev.	Surface Area	10 Ft Deep		Area 4-10 Ft Deep		Area Under 4 Ft Deep		Excavation Required
	Ft.	Acres	Acres %		Acres %		Acres %		Cu.Yds.
Main Pool	686	419	104 24.8		229 54.7		190 45.3		1,708,000
Lat.Pool I	688	146	50 34.2		53 36.3		93 63.7		587,000
Lat.Pool II	688	24	12 50.0		13 54.2		11 45.8		187,000
TOTAL	---	589	166 28.2		295 50.1		294 49.9		2,482,000

Shallow wetland areas associated with multiple-purpose structure 1 will be improved and developed for waterfowl and furbearer use. These areas will be used for nature study and birdwatching.

Structure 2

Single-purpose structure 2 (2.24 square mile drainage area) will provide 37 acre-feet of sediment storage below the crest of the principal spillway, providing a 23-acre pool. In order to improve the quality of the sediment pool for incidental recreation usage Palatine Park District will excavate an estimated 46,000 cubic yards from the sediment pool; this material will be spoiled outside the floodpool area. Retarding storage of 262 acre-feet will be provided. The floodpool elevation of 754.6 will inundate 77 acres. The dam and spillway area will utilize an additional 5 acres.

A reinforced concrete principal spillway will be provided. A box inlet drop spillway will serve as an inlet structure with a 42 inch diameter concrete pipe conduit. The structure will utilize an impact basin for energy dissipation. The maximum design discharge will be 174 cubic feet per second.

The vegetated emergency spillway will have a bottom width of 140 feet and a design velocity of 7.5 feet per second. The spillway will be constructed in erosion resistant soils with an exit channel slope of 4 percent. The emergency spillway will be seeded with a mixture of tall fescue and smooth brome per construction specifications for seeding on earth dams.

No major utilities will need to be modified within the flood pool. Approximately 20 acres of the parking lot for William Rainey Harper Junior College has been raised an average of 3 feet, which puts it above the 5-year frequency flood elevation.

Structure 3

Single-purpose structure 3 (3.86 square mile drainage area) will provide a total storage capacity of 450 acre-feet including 45 acre-feet for sediment storage. Additional recreation storage will be provided by excavation within the 14 acre sediment pool. The retarding pool will store 405 acre-feet and inundate an estimated 78 acres. The dam and appurtenances will occupy an additional 5 acres.

The principal spillway will have a single stage box to a hooded inlet with a 48-inch diameter reinforced concrete pipe conduit. The outlet structure will be an impact basin for energy dissipation.

The vegetated emergency spillway will have a bottom width of 125 feet and a design velocity of 8.6 feet per second. The spillway will be constructed in erosion resistant soils with an exit channel slope of 3 percent. The emergency spillway will be seeded with a mixture of tall fescue and smooth brome per construction specifications for seeding on earth dams.

In order to improve the quality of the sediment pool for incidental recreation usage, the Schaumburg Park District will excavate an estimated 95,000 cubic yards from the sediment pool. This material will be spoiled in the borrow pits used for dam construction. This excavation coupled with some bank shaping of the sediment pool will provide an average depth sufficient to sustain fishlife.

No known utility reroutings or modifications will be involved in the installation of this structure.

Structure 4

This single-purpose structure (3.64 square mile drainage area) will be operated by allowing low flows to bypass the structure and diverting flood flows into a storage area, over a reinforced concrete chute. The flow in the bypass channel will be limited to 513 cubic feet per second by a control orifice. The maximum capacity of the diversion weir and chute is 1,370 cubic feet per second. No emergency spillway or other provisions are necessary since the flood storage is below grade. After storm flows have subsided in the downstream channel areas, evacuation pumps will remove the floodwaters from the structure. These will be inclined screw-type pumps with a total capacity of 36 c.f.s. Maximum evacuation time is 6.5 days.

Storage will be located in two excavated areas (See layout sketch-structure 4), located on either side of the bypass channel. An interconnecting 8-foot diameter culvert will be used to balance water levels in both storage areas. A total of 498 acre-feet of storage will be provided in the structure. Sediment pools totaling 33 acre-feet with surface areas totaling 8.6 acres will be provided with the remaining 465 acre-feet being utilized for floodwater detention. The maximum surface of the flood pools at flood stage will be 23.2 acres. The elevation of the sediment pools will be 680 feet, while the elevation at maximum flood stage will be 709.5 feet.

As the layout sketch shows, shaping of excavated material and sloping of the excavated area will permit a maximum usage of the small sediment pools. The estimated area required for development of site 4 is 80 acres.

The flood storage areas at this site are already partially excavated. Additional excavation required during project installation is not expected to disturb or require rerouting of any utilities within the area.

Structures 5 and 6

These single-purpose structures have drainage areas of 5.56 and 5.31 square miles respectively. Layouts of these excavated storage areas are shown on respective layout sketches. Each of these structures is equipped with a bypass channel (290 and 295 cubic feet per second respectively) with the excess flood flows diverted into the structures via reinforced concrete chutes. These chutes have a maximum design capacity of 1,220 cubic feet per second and 1,150 cubic feet per second respectively. As in structure 4, inclined screw pumps will be used to evacuate the structure after the flood is passed. These are designed to have

an evacuation capacity of 50 cubic feet per second and 48 cubic feet per second, respectively. Maximum evacuation time for both structures is 6.5 days.

Total storage capacity of structures 5 and 6 is 623 acre-feet and 649 acre-feet respectively. Structure 5 will have 73 acre-feet reserved for sediment while structure 6 will have 74 acre-feet. Structure 5 sediment pool will be 9.0 acres with waterline at elevation 705.0 feet. Structure 6 will have a sediment pool of only 5.4 acres with permanent water at 691.5 feet. Flood pools of structures 5 and 6 will be at elevation 742.4 and 743.5, respectively, with maximum surface areas of 17.6 and 14.7 acres.

Excavation of storage areas for structures 5 and 6 requires that suitable locations for disposal of this material be provided. On-site disposal proved to be the most economical means. Therefore, disposal of this material was planned (See layout sketches for structures 5 and 6) in order to minimize the adverse visual effects of constructing these structures. The layout sketches show how the excavated material from these structures can be placed in order to form a pleasing addition to the landscape. Since all excavation is planned to be placed on the site, shaping is considered an integral part of construction. Approximately 37 acres and 40 acres will be required to construct structures 5 and 6 respectively.

Channel Improvement

Channel improvement in Reach F will begin at Golf Road and extend upstream to the upstream side of Route 53 (Rohlwing Road). The estimated 1.8 miles (9,700 feet) of channel improvement will require 94,000 cubic yards of excavation; 15 acres of seeding, mulching, and fertilizing; rerouting of public utilities; and replacement of the Central Road bridge.

The proposed channel improvement will be excavated in till and alluvium. However, some zones of sand and sandy silt are present downstream from the Algonquin Road at depths greater than 9 feet. The channel design was further complicated by the necessity for containing the 100-year frequency flow within banks and the high tailwater caused by backwater from structure 1.

The outlet 3,920 feet of channel is designed (See plate 1) with riprap bottom and 3 feet vertically up the side slopes. This will protect the part of the channel where sandy material is expected. The 3 feet horizontal to 1 foot vertical side slopes in non-riprap portion of the channel cross-section should minimize maintenance from bank sloughing.

The riprap lining will only extend upstream to Algonquin Road. Upstream from this point a more conventional earth lined trapezoidal cross-section will be constructed (26 foot bottom, 1.5 to 1 side slopes). Soil analysis indicates this channel will be stable.

The outlet of channel improvement is the upstream end of the retarding pool of structure 1; therefore, any increased peaks induced by the channel improvement will be dissipated in the reservoir.

Urban buildup in Reach F will make it difficult to retain existing trees and other woody habitat on stream banks during channel construction. Where such cover is removed, vegetation will be restored by:

(1) Seeding ditchbanks, berms, and inside of spoil to a grass-legume mixture.

(2) Establishing suitable shrubs or trees on tops of spoils or along the outside edge of berms.

Approximately 26 acres of right-of-way will be required, costing an estimated \$130,000. In addition, utility rerouting will cost \$50,000. Replacement of the Central Road bridge will also be required bringing the total land rights cost for channel improvement to \$230,000.

The Division of Water Resource Management is providing assistance in the preparation of detailed land rights maps for the channel improvement. The above estimates reflect their experience for similar improvements in the metropolitan area.

Flood Plain Preserves

Undeveloped flood plain areas identified in reaches B, G, and H on the project map and the flood plain maps are identified as areas with great future damage potential and important hydraulic characteristics which affect both upstream and downstream flood crests. Portions of these flood plains will be used only for low intensity-low hazard uses. These designated low intensity-low hazard use areas (floodways) are identified on the project map and the flood-plains map as flood plain preserves. The Sponsors will insure that the 100-year frequency with-project flood profile as identified in this plan will not be altered. This will be accomplished by written agreement with the landowners by one or more of the following procedures:

(1) Securing channel and flood plain preserve maintenance rights-of-way with prohibition of:

- (a) channel enlargement
 - (b) channel or floodway filling
 - (c) building below identified flood profile elevations (See flood plain maps and profiles).
- (2) Long term lease arrangements
 - (3) Purchase of floodways.

The evaluated flood profiles are shown on the flood profile sheets for Reaches B, G, and H. Flood plain preserves are described as follows:

Reaches G and H

Based on present flood plain geometry, approximately 186 acres of the flood plain will be dedicated to low intensity-low flood hazard uses (flood plain preserve).

The village of Schaumburg will preserve a 700 foot wide flood plain preserve with 2,000 c.f.s. capacity from Higgins Road on the north to a point approximately 1,700 feet south of the center of section 23. From this point, a 1,000 foot wide flood plain preserve with 2,700 c.f.s. capacity is to be provided to the southern village boundary. Total area is 114 acres.

The village of Elk Grove will provide a 1,000-foot wide flood plain preserve with 2,700 c.f.s. capacity from the common boundary with Schaumburg to a point approximately 2,000 feet west of the center of section 25; total area is 61 acres.

The Metropolitan Sanitary District will insure preservation of the flood plain from the Elk Grove Village boundary to the downstream end of Reach H. Total area is 11 acres.

Reach B

The Metropolitan Sanitary District and the village of Palatine will share responsibilities in this flood plain preserve. Palatine will assume responsibility within the village limits (15 acres) and the Metropolitan Sanitary District in the unincorporated area (60 acres). Flood plain preserves will require a width of 50 to 600 feet and capacity of 800 c.f.s. between Illinois Avenue and Old Plum Grove Road as shown on the flood plain maps. Total area is 75 acres.

EXPLANATION OF INSTALLATION COSTS

The total installation cost of the project is estimated to be \$26,515,800, of which \$11,889,100 (44.8 percent) will be paid from PL-566 funds and \$14,626,700 (55.2 percent) will be borne by other funds. Included in total costs are land treatment measures, \$1,960,900, and structural measures, \$24,554,900.

Land Treatment

PL-566 funds will be furnished in the amount of \$95,000 to provide technical assistance to accelerate the current program. Funds from all sources other than PL-566 such as existing federal or state programs, special legislation, or private sources will be provided, in the amount of \$1,865,900 for installing land treatment measures.

These include Public Law 46, carried out by the Soil and Water Conservation District and the Soil Conservation Service; the existing forestry program of the Illinois Department of Conservation, Division of Forestry; and the cooperative forest management programs, administered by the Illinois Department of Conservation in cooperation with U. S. Forest Service. These funds will be used to maintain personnel and equipment of the Soil Conservation Service and the Illinois Division of Forestry. These people will assist the North Cook Soil and Water Conservation District in helping landowners and operators to develop conservation plans and forest management plans. They will also assist these landowners and operators in establishing, construction, and maintaining planned soil and water conservation practices over the 9-year installation period.

Estimated costs for technical assistance are based on current expenditures for comparable personnel, equipment, vehicles, and overhead.

Costs of technical assistance for the installation of the forest land treatment measures on private land are based on actual expenditures and accomplishments by the Illinois Department of Conservation, Division of Forestry. An analysis of the costs against the accomplishments was made of each measure to determine unit costs for technical assistance.

Structural Measures

The installation costs for structural measures include all PL-566 and other costs for installation of these works of improvement. These costs are shown in Table 2 as construction, engineering, land rights, and project administration.

Construction costs are the engineer's estimate of the cost of all material, labor, and equipment involved in construction. Unit costs are based on current prices for similar construction work in Illinois. A contingency allowance of 12 percent is added to the construction cost of the 5 floodwater retarding structures, one multiple-purpose recreation development structure, and 9,700 feet of channel improvement to defray any unforeseen additional costs incurred during construction.

Engineering costs are those costs incurred by engineers and other technicians for surveys, designs, and preparation and interpretation of plans and specifications. At the time of project installation, additional surveys will be needed at the dam sites as a basis for structural design and construction cost estimates. Geologic drilling and soil mechanics tests and analysis will be performed to verify site and foundation conditions. Reservoir storage volumes will be computed from topographic maps made during work plan preparation.

Land rights costs include the cost of acquiring land rights (including survey fees and legal fees) plus all related engineering, construction, and land costs for modification and/or rerouting of road and bridges, culverts, utilities, and fences. Costs of modifying bridges and culverts and moving or modifying utilities were computed for each structure. These land rights cost estimates were supplied by the sponsoring organizations.

Relocation payments to eligible displaced persons include moving and related expenses, financial assistance for replacement housing for displaced persons whose dwellings were acquired, and loss of income payments for displaced businesses.

Project administration costs are those costs associated with the installation of structural measures including the cost of contract administration, review of engineering plans prepared by others, government representatives, and necessary inspection service during construction. Also included are relocation assistance advisory services and administrative costs associated with making relocation payments.

Relocation assistance advisory services include such items as determining the need of displaced persons for relocation assistance, providing current and continuing information on availability and prices of comparable decent, safe and sanitary replacement housing and mobile home sites, assisting displaced persons in obtaining and becoming established in a suitable business replacement location, and informing displaced persons of the benefits to which they are entitled.

Administrative costs associated with relocation assistance advisory services include serving notice of displacement providing appropriate application forms, assisting in filing applications, hearing and resolving grievances, and making relocation payments.

Cost Allocation

Construction and engineering costs for structure 1 are allocated to recreation or flood prevention by the Use of Facilities Method. This results in 64.2 percent (\$406,900) allocated to flood prevention and 35.8 percent (\$226,900) to recreation. Land rights costs of \$472,000 are allocated entirely to recreation.

Relocation payments associated with structure 1 are estimated to total \$90,000. Based upon the ratio of PL-566 funds and other funds to the total project costs, 55.2 percent (\$49,700) is allocated to Other and 44.8 percent (\$40,300) is allocated to the Service. If the displacement occurs before July 1, 1972, the Service will provide the first \$25,000 for each displacement.

Construction and engineering costs (\$1,870,000) for dredging associated with multiple-purpose recreation development structure 1 are allocated entirely to recreation. Spoil disposal area easement costs of \$204,000 are also allocated to recreation. Construction and engineering costs for recreation facilities associated with multiple-purpose recreation development structure 1 total \$7,203,600 and are allocated entirely to recreation.

Costs for floodwater retarding structures 2, 3, 4, 5, and 6 total \$8,690,200 and are allocated to flood prevention. All costs for channel improvement (\$370,500) are allocated to flood prevention.

All costs for flood plain preserves in Reaches B, G, and H are allocated to flood prevention. The economic cost is \$2,610,000.

Total installation cost for all structural measures is \$22,144,100. These costs are allocated as follows: \$12,135,400 or 54.8 percent to flood prevention and \$10,008,700 or 45.2 percent to recreation.

Cost Sharing

Structural measure costs will be shared \$11,794,100 by Public Law 566 funds and \$12,760,800 by other funds. The PL-566 funds will be spent for construction, engineering, relocation and project administration costs for 5 single-purpose floodwater retarding structures, 1.8 miles of channel improvement, and part of the multiple-purpose recreation development structure (including the dam, dredging, and recreation facilities). The cost-sharing responsibility results in the following distribution of cost:

Multiple-purpose recreation development structure 1 -- Recreation and Flood Prevention.

Dam -- PL-566 funds will pay \$570,900 including \$473,000 for construction, \$57,600 for engineering, and \$40,300 for relocation payments. Other funds will pay \$624,900 including \$103,200 for construction, \$472,000 for land rights, and \$49,700 for relocation payments.

Dredging -- PL-566 funds will pay \$1,020,000 including \$850,000 for construction and \$170,000 for engineering. Other funds will pay \$1,054,000 including \$850,000 for construction and \$204,000 for land rights.

Recreation facilities -- PL-566 funds will pay \$3,601,800 including \$3,335,000 for construction, and \$266,800 for engineering. Other funds will pay \$3,601,800 including \$3,335,000 for construction and \$266,800 for engineering.

Five single-purpose floodwater retarding structures -- PL-566 funds will pay \$4,333,700 including \$3,849,600 for construction and \$484,100 for engineering. Other funds will pay \$4,356,500 for land rights.

Channel improvement -- PL-566 funds will pay \$140,500 including \$117,100 for construction and \$23,400 for engineering. Other funds will pay \$230,000 for land rights.

Flood plain preserves -- other funds will provide land rights with an economic cost of \$2,610,000.

All structural measures -- PL-566 funds will pay \$11,794,100 including \$8,624,700 for construction, \$1,001,900 for engineering, \$40,300 for relocation payments, and \$2,127,200 for project administration costs. Other funds will pay \$12,760,800 including \$4,288,200 for construction, \$266,800 for engineering, \$7,872,500 for land rights, \$49,700 for relocation payments and \$283,600 for project administration.

Included in land rights costs to be paid from other funds are \$50,000 for bridge replacement, \$270,000 for utility rerouting or modification, \$204,000 for dredging disposal area, and \$2,000 for low earth levees. Included in project administration costs to be paid from other funds are \$26,000 for relocation assistance advisory services.

The following is the estimated schedule of obligations for the 9-year installation period:

<u>Fiscal Year</u>	<u>Measures</u>	<u>Public Law 566 Funds</u>	<u>Other Funds</u>	<u>Total</u>
First	Structural Measures	1,453,200	1,155,000	2,608,200
	Land Treatment	14,200	186,600	200,800
Second	Structural Measures	1,837,000	557,000	2,394,000
	Land Treatment	19,000	290,000	309,000
Third	Structural Measures	459,500	2,989,500	3,449,000
	Land Treatment	28,500	373,200	401,700
Fourth	Structural Measures	584,000	2,265,000	2,849,000
	Land Treatment	19,000	373,200	392,200
Fifth	Structural Measures	570,900	624,900	1,195,800
	Land Treatment	14,300	186,600	200,900
Sixth	Structural Measures	1,160,500	1,284,000	2,444,500
	Land Treatment	0	186,600	186,600
Seventh	Structural Measures	1,201,800	1,201,800	2,403,600
	Land Treatment	0	93,300	93,300
Eighth	Structural Measures	1,200,000	1,200,000	2,400,000
	Land Treatment	0	93,300	93,300
Ninth	Structural Measures	1,200,000	1,200,000	2,400,000
	Land Treatment	0	93,100	93,100
TOTAL	Structural Measures	9,669,900	12,477,200	22,144,100
TOTAL	Land Treatment	95,000	1,865,900	1,960,900
	Project Administration	2,127,200	283,600	2,410,800
GRAND TOTAL		11,889,100	14,626,700	26,515,800

This schedule may be changed from year to year to conform with appropriations, accomplishments, and any mutually desirable changes.

EFFECTS OF WORKS OF IMPROVEMENT

The program of land treatment and structural measures in Upper Salt Creek Watershed will directly benefit 3,380 acres (1,940 acres in Upper Salt Creek Watershed and 1,440 acres in Lower Salt Creek Watershed) from reduced floodwater and sediment damages. Damages will be reduced 88 percent in the existing and projected development directly benefiting about 1,200 existing residences, 3 schools, 2 businesses, and 24 road crossings within Upper Salt Creek Watershed.

The planned land treatment measures will reduce average annual rates of erosion in areas under construction from 70 tons per acre to 50 tons per acre, a 29 percent reduction. This will be accomplished through the encouragement of early application of vegetative control measures upon completion of construction and interim seeding in areas which are expected to lack cover for extended periods prior to final construction. Debris basins and retention-type structures will be installed

which will store approximately 40-50 percent of the soil eroded from these areas. On-site benefits accruing to over 12,000 property owners will include reduced maintenance costs for clearing sediment from streets and drainage facilities. Off-site effects from land treatment measures will include reduced sedimentation in the floodwater retarding structures, the multiple-purpose structure, and other water bodies. Land treatment measures will also esthetically benefit Salt Creek by reducing levels of turbidity.

Installation of the 5 floodwater retarding structures, 1 multiple-purpose structure, 2 flood plain preserve areas, and 1.8 miles of channel improvement will provide significant effects within Upper Salt Creek watershed and the downstream areas in DuPage County. The structures and flood plain preserves will have the following effects:

- (1) Provide areas for temporary floodwater storage, (2) slowly release these floodwaters relieving overloaded channels, (3) significantly reduce the number of flood events over a period of years, (4) greatly reduce future flood crest elevations and durations of high water, and (5) substantially reduce the area subject to flooding. Channel improvement in Reach F will further reduce flood-crest elevations in this area and minimize backwater effects due to the installation of structure 1.

Reduction in the extent and elevation of flooding for the 100-year frequency event with and without project is shown on the flood plain maps. All of the estimated 1,200 residences within the 100-year frequency flood plain will be protected from surface water flooding with the project. About 240 residences in the 100-year with-project flood plain, which will still be subject to basement or lower level storm sewer backup can be protected by flood proofing measures. (See the flood plain maps for location.)

The project would eliminate surface flooding from a storm of June 1967 magnitude. Of the estimated 1,000 residences experiencing flooding in June 1967 an estimated 800 homes would be completely protected from flooding. The remaining 200 homes would experience only basement and lower level flooding caused by storm sewer backup and could be protected by flood proofing through the land treatment program. If this storm had occurred with the project in place, the estimated damages would have been reduced to \$188,100 from \$926,600.

Expansion of the green belt principle already successfully used in Rolling Meadows, Reaches D and E, and in Elk Grove Village, Reaches I and J, will be used by establishing flood plain preserves in Reach B on Salt Creek and G and H on the west branch of Salt Creek. These areas will be dedicated to public use and low

Intensity developments such as parks, picnic areas, and open space. Future damages will be prevented and the natural flood storage capabilities of these valley areas will be maintained in the public interest.

The installation of structural measures is only part of the flood damage reduction program for Upper Salt Creek Watershed. Flood damage reduction will continue through the following project efforts:

(1) Metropolitan Sanitary District's floodwater detention requirement in all new developments could substantially reverse the present trend of increasing flood peaks and thereby increase the effectiveness of the structural measures.

(2) An active program of providing technical assistance on floodproofing problems will significantly reduce the remaining with-project damages. However, technical assistance must be available to individuals and villages. Homeowners within the flood hazard area must be informed of the nature of the flood problem.

(3) The principle of channel adoption by various public agencies throughout the watershed will assure the effectiveness of the channel system and prevent alterations which would ultimately increase flood damages.

Incidental recreation benefits are expected to accrue to the public from the sediment pools associated with floodwater retarding structures 2, 3, 4, 5, and 6. These pools will have a combined surface area of about 60 acres and a surrounding land area in public ownership totaling 153 acres. Sketches show the long-term development plans for public recreation and wildlife uses for structures 4, 5, and 6.

It is estimated that these areas will attract 300,000 visitors annually. Since the land areas around sites 5 and 6 will be hilly, it is expected that these 2 sites will provide excellent opportunities for winter sport enthusiasts. Other activities expected at these 5 small sites include fishing, picnicking, nature study, ice skating, and ice fishing.

Initially the pools associated with structures 2, 3, 4, 5, and 6 will be sufficiently deep to support fishlife and if properly managed will provide good quality fishing until such time as the pools are silted in. The local sponsors of these pools will require that water quality standards for recreation are met and that the associated recreational developments around the pools have sanitary facilities which meet state and local health regulations.

The 589-acre pool and 1,180-acre recreational area associated with multiple-purpose structure 1 will result in an estimated annual use by 2,500,000 persons after an initial 10-year buildup period.

The recreational season was considered to be year round. Estimates of visitor day usage by activity for the planned cost-share facilities are as follows:

<u>Activity</u>	<u>Annual Use</u>
Picnicking	950,000
Boating	220,000
Fishing	480,000
Bicycling	180,000
Hiking	100,000
Nature Study	120,000
Snowmobiling	50,000
Ice Fishing	50,000
Day Camping	60,000
Total	<u>2,210,000</u>

An estimated 1,610,000 annual visitor days are credited to the planned development with the remaining visitor day usage being credited to the existing Cook County Forest Preserve facilities. Design capacity is increased from 5,000 visitors to 18,000 visitors.

Additional non-cost-share facilities will be installed by the Cook County Forest Preserve. Estimates of visitor days usage provided by these facilities are as follows:

<u>Activity</u>	<u>Annual Use</u>
Model Airplane Flying	130,000
Tobogganing	30,000
Sledding	50,000
Skiing	30,000
Ice Skating	50,000
Total	<u>290,000</u>

Jobs will be created for both skilled and unskilled labor during project associated construction activities. A multiplier effect from these wage expenditures will be felt throughout the local economy. The operation and maintenance of project measures will create both full and part time jobs and generate sales for associated industries during the life of the project.

PROJECT BENEFITS

Annual project benefits in Upper Salt Creek Watershed due to the works of improvement will amount to \$3,338,900. This includes flood prevention and sediment reduction benefits accruing from the

land treatment program totaling \$15,000 which are not used for project justification. The project would reduce damages from a future flood of the same magnitude as the flood of June 1967 from about \$931,400 to \$188,100; a reduction of 80 percent. Individual items of benefit are shown in Tables 5 and 6.

The land treatment program will provide an estimated average annual benefit of \$15,000. These benefits will be realized from reduced main stream flooding and sediment damage.

In addition to the effects of the land treatment measures, the structural works of improvement will provide floodwater damage reduction benefits in Upper Salt Creek Watershed averaging \$733,900 annually. This will be accomplished by (1) eliminating flood hazard in many areas (2) preventing buildup in flood plain preserves having a potential for future flood damages, and (3) substantially reducing flood elevations and occurrences in exceptionally low flood plain areas.

Installation of structural measures will cause an appreciable savings in the costs of planned State of Illinois, Division of Water Resource Management, channel improvement in Lower Salt Creek Watershed. Annual benefits are equivalent to amortization of the estimated present savings over the 100-year project life; these benefits will total \$127,800 annually.

Average annual recreation benefits derived from the planned recreational development associated with multiple-purpose structure 1 are estimated to be \$1,946,500. This is based on a 1,610,000 annual visitor days after an initial buildup period of 10 years. A value of \$1.50 was assigned to each visitor day.

Additional recreation benefits will accrue from the use of other existing and proposed Cook County Forest Preserve District facilities in the multiple-purpose recreation development structure 1. Annual visitor attendance is estimated to be 890,000; approximately 600,000 visitor days will be from the use of existing facilities, while the remaining 290,000 visitor days will be for the use of proposed non-water-related facilities.

Incidental recreation benefits will result from the use of the sediment pools of structures 2, 3, 4, 5, and 6. The combined pool area of these impoundments is about 60 acres with an annual visitor day attendance estimated at 300,000. Average annual incidental recreation benefits are estimated at \$180,000. This is based upon a visitor day value of \$0.75 and allowing for a 10-year buildup period.

Secondary benefits of \$335,700 annually will accrue as a result of the project. Increased sales will be realized by firms

supplying recreation services, supplies, and equipment as a result of the recreational opportunities created by the project. Secondary benefits which may accrue outside the project area are not considered pertinent to the economic evaluation.

Redevelopment benefits were not evaluated but will be substantial. Installation of the planned project in Upper Salt Creek Watershed will generate employment for construction of the project and in associated businesses.

In addition to the monetary benefits, there are other substantial intangible values which will accrue from the project such as better living conditions, a sense of economic security due to abatement of the fear of flood damage, and increased potential for wildlife and fisheries development. Continued preservation efforts and fire protection will materially benefit the esthetics of the forested areas and maintain the hydrologic condition of the watershed.

COMPARISON OF BENEFITS AND COSTS

The average annual cost of structural measures in the Upper Salt Creek Watershed, including installation, operation, and maintenance is \$1,966,200. When the project is completely installed, these measures are expected to produce average annual primary benefits of \$2,988,200 or \$1.50 for each \$1.00 cost.

With secondary benefits included, the Upper Salt Creek Watershed project will produce benefits of \$1.70 for each \$1.00 of equivalent cost. (See Table 6).

PROJECT INSTALLATION

The works of improvement will be installed in a 9-year period. Federal assistance for carrying out the works of improvement on non-federal land as described in this work plan will be provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666), as amended. This assistance is subject to the appropriation of funds.

The Sponsors with the assistance of the Extension Service and other interested agencies, will carry out the educational phase of the program. This will be accomplished by conducting general information and local community meetings; preparing radio, television and press releases; and using other methods of getting information to the landowners, villages, and other interested groups in the watershed. Such action will help achieve understanding and stimulate participation in the entire watershed project.

Land Treatment

Land treatment measures will be established on the land by the owners, groups, and villages in cooperation with the North Cook Soil and Water Conservation District. The cost of applying these measures will be borne by the owners of the land, groups, and villages. The soil and water conservation district will encourage landowners and villages to establish complete resource and conservation programs on lands they own or control. The Soil Conservation Service, through the soil and water conservation district, is presently giving technical assistance to villages, landowners, and operators in planning and establishing land treatment measures. Technical assistance to the soil and water conservation districts will be accelerated to assure application of the planned measures within the 9-year installation period of the project.

Land treatment will be accomplished by working with individual landowners, developers, and the 7 major governmental bodies who have authority over land use in this watershed. These governmental bodies are: Palatine, Inverness, Rolling Meadows, Schaumburg, Hoffman Estates, Elk Grove, and Cook County. These villages will be or are cooperators with North Cook Soil and Water Conservation District.

In addition, there are several public land holding entities in the watershed. They include the Cook County Forest Preserve District, Palatine Park District, Salt Creek Rural Park District, Rolling Meadows, Elk Grove Park District, and others. It is expected that these agencies will become a cooperator with the North Cook Soil and Water Conservation District. Conservation plans will be developed for these tracts of land. The Cook County Highway Department and the State of Illinois, Division of Highways, will develop their own conservation plans with consultive services from the Soil and Water Conservation District.

Existing ordinances, subdivision regulations, and other regulatory measures will be used to implement the desired treatment. Where necessary, additional regulations and ordinances will be developed to obtain the necessary land treatment. One example of an additional ordinance is the sewer permit ordinance recently amended by the Metropolitan Sanitary District of Greater Chicago. This amended ordinance requires all future developments to provide storage of the 100-year frequency storm runoff within the built-up area.

Forest land treatment measures will be installed on private land by the landowners. Technical assistance will be furnished by the Illinois Department of Conservation, Division of Forestry, in cooperation with the U. S. Forest Service to those landowners who request this service.

Additional technical assistance for planning and applying practices to enhance wildlife resources will be furnished by the

Illinois Department of Conservation, Division of Wildlife Resources, through its regular individual farm habitat development program. Examples of material assistance available from the department are planting stock and use of tree planters for establishing wildlife habitat. The Department of Conservation, Division of Fisheries, provides fish for suitable ponds and fisheries management information.

Structural Measures

The recommended schedule for installation of the works of improvement is in the following pattern: Structure 5 should be installed prior to structure 4; flood plain preserve in Reach B should be established before installation of structure 6; structures 2, 3, 4, 5, and 6 and flood plain preserves in reaches B, G, and H should be in place before structure 1 is installed; and structure 1 should be in place prior to channel improvement in Reach F; therefore, the general sequence of installing the structural measures is as follows:

- (1) Structure 5 and flood plain preserve B
- (2) Structure 6
- (3) Structures 2 and 3
- (4) Structure 4 and flood plain preserves G and H
- (5) Structure 1
- (6) Dredging and channel improvement
- (7) Recreation facilities

Circumstances, such as timing of local financing and land rights, may require some deviation from this schedule.

Structures 2, 3, 4, 5, and 6

The Metropolitan Sanitary District of Greater Chicago will be the sponsoring and contracting local organization for floodwater retarding structures 2, 3, 4, 5, and 6.

Specifically for the 5 floodwater retarding structures, the Metropolitan Sanitary District will provide necessary legal, administrative, and clerical personnel needed to advertise, award, and administer the contracts. Land rights for structures 2, 3, 5, and 6 will be provided by the Sanitary District. The village of Palatine and the Sanitary District will jointly provide land rights for structure 4.

The Soil Conservation Service with PL-566 funds will (1) defray project construction costs and (2) provide technical assistance in design, preparation of specifications, inspection of construction, execution of certificates of completion, and

related tasks for the establishment of the 5 floodwater retarding structures. Non-project construction costs for structure 2 will be borne by the Palatine Park District; like costs for structure 3 will be financed by the Schaumburg Park District.

Multiple-Purpose Recreation Development Structure 1

The local responsibilities for multiple-purpose recreation development structure 1 will be shared between the State of Illinois and the Cook County Forest Preserve District as follows:

The Forest Preserve District will provide all permanent land rights necessary for the construction of the dam and its associated facilities for public recreation in fee-simple title. The State will provide all other land rights necessary. This is confined to construction, temporary easements, utility reroutings, and utility modifications where necessary.

The Forest Preserve District will enter into an engineering services contract for the plans and construction specifications of the basic recreation facilities eligible for cost sharing. The Forest Preserve District and the Service (PL-566 funds) will share equally in this cost. The Service will review and approve construction plans, prepare contract payment estimates, execute certificates of completion, and perform other related tasks for the preparation of the plans for the cost shared recreation facilities.

The Forest Preserve District will enter into an engineering services contract for the plans and construction specifications of the basic recreation facilities not eligible for cost sharing. The Forest Preserve District will bear the entire cost of this contract.

The Forest Preserve District will provide all legal, administrative, and clerical personnel needed to advertise, award, and administer all engineering services contracts and construction contracts for the recreation facilities associated with structure 1. The State of Illinois will provide all legal, administrative, and clerical personnel needed to advertise, award, and administer the construction contracts for structure 1 and the associated dredging.

The State of Illinois will bear 17.9 percent of the construction costs of the dam associated with multiple-purpose recreation development structure 1. The Service, (PL-566 funds), will pay the remaining 82.1 percent of these costs. The Soil Conservation Service will review and approve construction plans, inspect construction, prepare contract payment estimates, make final inspection, execute certificates of completion, and perform other related tasks for the establishment of the dam.

The State of Illinois will provide, at no cost to the government, relocation assistance advisory services including such items as determining the need of displaced persons for relocation assistance, providing current and continuing information on availability and prices of comparable decent, safe and sanitary replacement housing and mobile home sites, assisting displaced persons in obtaining and becoming established in a suitable business replacement location, and informing displaced persons of the benefits to which they are entitled.

The State of Illinois will, as a part of the project administration, provide personally or by first class mail (1) written notice of displacement and appropriate forms to each displaced person or business operation, (2) assist in filing application, (3) review and take action on applications for relocation assistance, (4) review and process grievances in connection with displacements, and (5) make relocation payments. As part of its project administration obligation the Service will assist the Sponsoring Local Organization in fulfilling the above responsibilities. The State of Illinois has determined that decent, safe, and sanitary replacement housing is available for the apartment dwellers. The 170 trailers will be moved by the owner-occupants to new locations. Displaced persons will be given notice to vacate at least 90 days before they have to move.

The State of Illinois, the Forest Preserve District, and the Service (PL-566) will share in the construction costs of the recreation facilities eligible for cost sharing associated with multiple-purpose recreation development structure 1. The State of Illinois and the Service will share in the construction costs of the dredging. The Service will review and approve construction plans, inspect construction, prepare contract payment estimates, make final inspection, execute certificates of completion, and perform other related tasks for the dredging and establishment of the cost shared recreation facilities.

The State of Illinois will finance all construction costs for the recreation facilities not eligible for cost sharing. The Forest Preserve District will (1) provide the existing facilities, (2) provide necessary legal, administrative, and clerical personnel needed to advertise, award, and administer the contracts, and (3) provide technical assistance in design, preparation of specifications, inspection of construction, preparation of contract payment estimates, final inspection, execute certificates of completion and related tasks for the establishment of the recreation facilities not eligible for cost sharing.

Channel Improvement (Reach F)

As the contracting local organization for the channel improvement in Reach F, the State of Illinois will (1) secure the necessary land rights and (2) provide necessary legal, administrative, and clerical personnel needed to advertise, award, and administer the contracts.

The Service, with PL-566 funds, will (1) finance all project construction costs and (2) provide technical assistance in design, preparation of specifications, inspection of construction, preparation of contract payment estimates, final inspection, execute certificates of completion, and related tasks for the establishment of the channel improvement.

Flood Plain Preserves B, G, and H

The Metropolitan Sanitary District, along with the village of Palatine, Schaumburg, and Elk Grove will provide all land rights for the establishment of the flood plain preserves.

General

Structural measures will be installed during the 9-year period pursuant to the following conditions:

(1) Required land treatment above the structures has been installed. Local Sponsoring Organizations shall obtain agreements to carry out recommended soil conservation measures from owners of not less than 50 percent of the land situated in drainage area above each detention reservoir to be installed with federal assistance.

In addition to the above provision, conservation plans will be prepared and not less than 75 percent of the effective land treatment measures will be installed or their installation commenced, on sediment source areas which, if uncontrolled, would require material increase in the cost of construction, operation, or maintenance of all structural measures.

(2) All land rights have been secured for all structural measures. In lieu of this requirement, a written statement may be made by the Sponsors stating that their rights of eminent domain will be used, if needed, to secure the remaining land rights and that sufficient funds are available for the purchase of these needed land rights.

(3) A mutual agreement on a schedule of construction and on plans and specifications shall be reached. Term of contracts and all matters pertaining to contracts or to works of construction shall be mutually satisfactory in accordance with federal, technical, and administrative specifications.

(4) The Sponsoring Organizations are prepared to advertise, award, and administer the contracts for the structures.

Full conformance to state and federal laws and regulations shall be the responsibility of the nonfederal interests and shall be secured at no cost to the federal government and reasonable evidence of conformity shall be presented to the mutual satisfaction of all parties.

(5) Operation and maintenance agreements have been executed on all channel reaches within Upper Salt Creek Watershed.

(6) Project agreements for construction of structural measures and operation and maintenance agreements have been executed.

(7) Federal funds are available.

FINANCING PROJECT INSTALLATION

Federal technical assistance and installation services for construction under authority of PL-566 are contingent upon appropriation of funds for these purposes.

Land Treatment

Table 1 shows the amount of land programmed for treatment and the cost of installing land treatment measures.

PL-566 funds will provide \$95,000 for technical assistance for additional Soil Conservation Service personnel. The going land treatment program will continue with \$63,000 provided for technical assistance under authority of Public Law 46.

Technical assistance to landowners for installing forest land measures will cost \$600 and will be provided for by the existing State and Federal cooperative forestry programs.

Installation costs for land treatment measures will be paid by landowners, groups, and villages. The sponsoring Soil and Water Conservation District will seek such allocation of Rural Environmental Assistance Program funds as are needed to cost share on land treatment measures to meet project objectives within the watershed.

Structural Measures

The Metropolitan Sanitary District will sell bonds to provide funds (\$5,003,200) for:

(1) All or part of land rights costs on structures 2, 3, 4, 5, and 6 and the flood plain preserves in Reaches B and H. Estimated cost is \$4,916,500.

(2) All nonfederal project administration costs for structures 2, 3, 4, 5, and 6. Estimated cost is \$86,700.

The State of Illinois will obtain funds (\$2,979,600) from the Illinois State Legislature for:

(1) All the land rights for the channel improvement in Reach F and all the land rights (construction disposal area) for the dredging associated with multiple-purpose recreation development structure 1 and part of the land rights (utility modifications) associated with multiple-purpose recreation development structure 1. Estimated cost is \$654,000.

(2) All the nonfederal construction costs of the dam and dredging and part of the construction costs of the recreation facilities associated with multiple-purpose recreation development structure 1. Estimated cost is \$2,204,300.

(3) All relocation assistance advisory services. Estimated cost is \$26,000.

(4) Part of the relocation payment costs. Estimated cost is \$49,700.

(5) All nonfederal project administration costs for channel improvement in Reach F, and for the dam and dredging associated with multiple-purpose recreation development structure 1. Estimated cost is \$45,600.

The Cook County Forest Preserve District will provide funds (\$2,728,000) from its construction and development fund and/or non-referendum bonds.

(1) Part of the land rights for the dam and all the land rights for the recreation facilities associated with multiple-purpose recreation development structure 1. Estimated cost is \$252,000.

(2) All nonfederal engineering costs for recreation facilities associated with multiple-purpose recreation development structure 1. Estimated cost is \$266,800.

(3) Part of the nonfederal construction costs of the recreation facilities associated with multiple-purpose recreation development structure 1. Estimated cost is \$2,083,900.

(4) All nonfederal project administration costs (\$125,300) for the recreation facilities associated with multiple-purpose recreation development structure 1.

The Cook County Forest Preserve District will also provide all costs (engineering, construction, and project administration) for installation of the planned non-cost shared recreation facilities. Estimated cost is \$734,400.

The village of Schaumburg will dedicate approximately 114 acres in Reaches G and H as flood plain preserves (estimated economic value of \$1,140,000). Elk Grove village will dedicate approximately 61 acres (estimated economic value of \$610,000) in Reach H as a flood plain preserve. The village of Palatine will dedicate approximately 15 acres (estimated economic value of \$150,000) in Reach B as a flood plain preserve.

Non-project costs of \$46,000 for excavating and shaping the pool area of structure 2 will be financed by the Palatine Park District from their general operating budget.

Schaumburg Park District will finance the non-project costs for excavating and shaping the reservoir of structure 3 (estimated \$94,000). Funds will be obtained from the general operating budget.

The village of Palatine will provide approximately 30 acres of presently owned land (estimated value of \$150,000) toward the installation of structure 4.

The Soil Conservation Service will provide PL-566 funds (\$11,794,100) for:

(1) All federal construction costs for multiple-purpose recreation development structure 1 (dam, dredging, and recreation facilities); structures 2, 3, 4, 5, and 6; and the channel improvement. Estimated cost is \$8,624,700.

(2) All federal engineering costs for multiple-purpose recreation development structure 1 (dam, dredging, and recreation facilities); structures 2, 3, 4, 5, and 6; and the channel improvement. Estimated cost is \$1,001,900.

(3) All federal relocation payment costs. Estimated cost is \$40,500.

(4) All federal project administration costs. Estimated cost is \$2,127,200.

PROVISIONS FOR OPERATION AND MAINTENANCE

Land Treatment

Land treatment measures will be maintained by villages, landowners, and operators, as provided in their cooperative agreement with the North Cook Soil and Water Conservation District. Technical assistance will be provided by the North Cook Soil and Water Conservation District; Soil Conservation Service personnel; the Illinois Department of Conservation, Divisions of Game and Fisheries; and the Illinois Department of Conservation, Division of Forestry, in cooperation with the U. S. Forest Service under the cooperative forestry programs.

Structural Measures

Multiple-purpose structure 1 and associated cost shared recreational facilities will be operated and maintained by the Cook County Forest Preserve District.

Structure maintenance costs are estimated to be \$5,100 annually. Major maintenance items will include replacing eroded materials

and revegetation of eroded areas of the fill and emergency spillways, mowing vegetation, and maintaining or replacing wave protection measures.

Annual operation, maintenance, and replacement costs of the recreational facilities are estimated to be \$593,600. This estimate is based on an annual allowance equal to ten percent of the facilities construction costs adjusted downward to reflect adjusted normalized prices.

Costs are assumed to be divided equally between expenses for (1) operation and maintenance and (2) replacement of facilities. Operation and maintenance costs will consist mainly of expenses for custodial services, labor, and materials needed for daily upkeep and repairs.

Replacement costs for the facilities will vary greatly by individual item. Items such as picnic tables and trash cans will need to be replaced frequently.

Responsibility for operation and maintenance of the recreational development at structure 1 by the Cook County Forest Preserve District will include the establishment and enforcement of regulations regarding such items as hours of use, types of use permitted, provisions for safety, and monitoring of water quality. The recreational developments will be operated and maintained in accordance with state and local health regulations.

The Illinois Nature Preserve Commission and the Cook County Forest Preserve District will jointly watch for any impairment or disturbance of the natural woodland areas in the Busse Forest Nature Preserve. In the event that the installation of structure 1 causes any adverse effects on the Busse Forest Nature Preserve, the Forest Preserve District will install such protective measures as silt basins and additional low earth levees as necessary to reduce the adverse effects.

The Metropolitan Sanitary District of Greater Chicago will operate and maintain in proper working order the pumping and spillway facilities on structures 4, 5, and 6. Ice and debris that may hamper their function will be immediately removed. These annual maintenance costs include replacement costs and are estimated to be \$25,800. These pumps will be automatic. They will turn on when flow in the outlet channel is less than one-half capacity. The Sanitary District will also maintain the dam and spillway areas of structures 2 and 3. This maintenance is estimated to cost \$3,200 annually.

Operation and maintenance of public recreational developments associated with structures 2, 3, 4, 5, and 6 will be in accordance with state and local health regulations and public safety standards. Agreements between the Metropolitan Sanitary District of Greater Chicago and the respective

sponsors of these developments will list these responsibilities in detail. Sponsors for the recreation developments are listed as follows:

<u>Structure</u>	<u>Responsible Organization</u>
2, 5, & 6	Palatine Park District
3	Schaumburg Park District
4 (East part)	Salt Creek Rural Park District
4 (West part)	Palatine Park District

Operation and maintenance responsibilities for channel and flood plain preserves are shown in the following table:

<u>Legal Entity</u>	<u>Approx. Length (feet)</u>	<u>Location (Reach)</u>	<u>Flood Plain Preserve Area(acres)</u>	<u>Annual Maintenance Cost (\$)</u>
Metropolitan Sanitary Dis.	35,300	B,C,F,H.	71	5,500
Village of Palatine	22,200	A,B,C.	15	4,400
Ill.Div. of Highways	1,500	D.	--	200
Village of Rolling Meadows	9,500	D,E.	--	1,000
Village of Schaumburg	6,800	G,H.	114	300
Village of Elk Grove	2,600	H.	61	300
Cook County Forest Preserve	2,000	I.	--	100
Elk Grove Park District	10,000	I,J.	--	1,000

Specifically, sponsors of the flood plain preserves and the channels therein are required to maintain the present physical condition within the flood plain preserve and keep damageable values from building up within the area. Sponsors charged with maintenance responsibilities in other areas will (1) prevent natural blockage of the channel from trees, brush, and other debris, (2) prohibit changing the effective depth of the channel by either deepening the channel or filling in the flood plain, (3) prohibit channel straightening, (4) prohibit lateral encroachment into the channel cross section, and (5) perform any excavation necessary to bring the channel up to its present flow capacity.

Quality sport fishery development in each pool will require the application of management techniques. Undesirable fish species may have to be removed from the drainage area prior to each floodwater and multiple-purpose reservoir closure. If so, Department of Conservation fishery biologists will provide technical supervision and cost estimates of chemicals needed to do this job as the need arises.

Representatives of the Sponsoring Local Organizations will, after each heavy rain, or at least annually, make maintenance inspections of all works of improvement, flood plain preserves,

and channel systems. A representative of the Soil Conservation Service will participate in these inspections at least annually for the first 3 years following installation of each structural measure. Items of inspection will include, but will not be limited to, the following items:

(1) Floodwater retarding structures -- the condition of the principal spillway and its appurtenances, the emergency spillway, the earth fill, and the vegetative cover of the earth fill and the emergency spillway.

(2) Channels -- the condition of Salt Creek Channel and its major tributaries to be sure that there has been no filling, dumping, or other willful or natural channel obstruction.

Provisions will be made for free access of representatives of the Sponsoring Local Organizations and the Soil Conservation Service to inspect, and for the Local Organizations to provide, maintenance for structural measures at any time.

The Sponsoring Local Organizations fully understand their obligations for maintenance as described in the Soil Conservation Service Operation and Maintenance Handbook for Illinois, and will execute specific maintenance agreements prior to the issuance of invitations to bid on the construction of structural measures.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Upper Salt Creek Watershed

Cook, Lake, and DuPage Counties, Illinois

Estimated Cost (In Thousands of Dollars) 1/

Installation Cost Item	Unit	Number		PL-566 Funds		Other Funds		Total	Total
		Non-Fed	Land	Non-Fed	Land	Non-Fed	Land		
LAND TREATMENT				SCS 3/	SCS 3/	F.S. 3/	F.S. 3/		
Land Areas 2/	Acres to be treated								
Cropland	1710			-	285.0	-		285.0	285.0
Forestland	40			-	-	1.3		1.3	1.3
Other	7390			-	1516.0	-		1516.0	1516.0
Technical Assistance				94.2	65.0	.6		65.6	159.8
TOTAL LAND TREATMENT				94.2	1866.0	1.9		1867.9	1962.1
STRUCTURAL MEASURES									
Soil Conservation Service									
Construction									
Floodwater retarding structures	Each	5		4246.0	-	-		-	4246.0
Multiple-Purpose structure	Each	1		521.7	113.8	-		113.8	635.5
Dredging (Str. 1)				937.6	937.6	-		937.6	1875.2
Recreation Facilities (Str. 1)				3678.5	3678.5	-		3678.5	7357.0
Channel Modification 4/ (N)	Miles	1.8		129.2	-	-		-	129.2
Subtotal - Construction				9513.0	4729.9	-		4729.9	14242.9
Engineering Services				1105.1	294.3	-		294.3	1399.4
Relocation Payments				40.3	49.7	-		49.7	90.0
Project Administration									
Relocation Assist. Advisory Service					26.6	-		26.6	26.6
Construction Inspection				1253.8	-	-		-	1253.8
Other				1086.2	283.4	-		283.4	1369.6
Subtotal - Project Adm.				2340.0	310.0	-		310.0	2650.0
Land Rights				-	12550.0	-		12550.0	12550.0
TOTAL STRUCTURE MEASURES				12998.4	17933.9	-		17933.9	30932.3
TOTAL PROJECT				13092.6	19799.9	1.9		19801.8	32894.4

1/ Price base - 1973

2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just adequately treated areas.

3/ Federal agency responsible for assisting in installation of work of improvement.

4/ Type of channel before project (N) - an unmodified well defined channel or stream.

Date

June 1974

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Upper Salt Creek Watershed, Illinois
(In Thousands of Dollars 1/)

Structural Measures	Installation Cost PL-566 Funds			Installation Cost - Other Funds			
	Construc- tion	Engi- neering	Relocat.2/ Payments	Total PL-566	Construc- tion	Engi- neering	Land Rights
Multiple-Purpose Recreation Development Str. 1							
Dam	521.7	63.5	40.3	625.5	113.8	-	472.0 4/
Dredging	937.6	187.5	-	1125.1	937.6	-	204.0
Recreation Fac.	3678.5	294.3	-	3972.8	3678.5	294.3	-
Subtotal	5137.8	545.3	40.3	5723.4	4729.9	294.3	676.0
Floodwater Retarding							
Str. 2	109.3	32.0	-	141.3	(46.0) 3/	-	2600.0 5/
3	287.3	78.2	-	365.5	(94.0) 3/	-	3100.0 5/
4	559.7	84.4	-	644.1	-	-	425.0 5/
5	1453.2	149.7	-	1602.9	-	-	910.0 6/
6	1836.5	189.7	-	2026.2	-	-	989.0 6/
Subtotal	4246.0	534.0	-	4780.0	(140.0)	-	8024.0
Channel Improvement	129.2	25.8	-	155.0	-	-	350.0 7/
Flood Plain Preserves							
	-	-	-	-	-	-	3500.0 8/
TOTAL	9513.0	1105.1	40.3	10658.4	4729.9	294.3	12550.0
Project Adm.				2340.0			
GRAND TOTAL				12998.4			17933.9

1/ Price base - 1973

2/ Relocation payments for displacements prior to July 1, 1972, will be shared as provided in PL-91-646 and in paragraph numbered 2 of the agreement.

3/ Non-project costs for sediment pool excavation and shaping.

4/ Land rights costs include (1) \$250,000 for about 10 acres of land (2) \$2000 for installation of low earth levees to protect Busse Forest Nature Preserve, (3) \$204,000 for construction disposal easements on an additional 170 acres, and (4) \$220,000 for minor modification and/or rerouting of utility lines.

5/ Costs are based on current land prices.

6/ Costs are purchase prices.

7/ Includes land costs of \$130,000 utility rerouting costs of \$50,000 and bridge replacement costs of \$50,000.

8/ Estimated costs for approximately 261 acres of undeveloped flood plain area.

Date June 1974

TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

Upper Salt Creek Watershed, Illinois
(In Thousands of Dollars) 1/

Item	COST ALLOCATION			COST SHARING				
	Purpose			PL-566		Other		
	Flood Prevention	Recreation	Total	Flood Prevention	Recreation	Total	Flood Prevention	Recreation
Multiple-Purpose Recreation Development Str 1								
Dam	506.6	754.4	1261.0	474.7	150.8	625.5	31.9	603.6
Dredging	-	2266.7	2266.7	-	1125.1	1125.1	-	1141.6
Recreation Fac.	-	7945.6	7945.6	-	3972.8	3972.8	-	3972.8
Subtotal	506.6	10966.7	11473.3	474.7	5248.7	5723.4	31.9	5718.0
Floodwater Retarding Str. 2, 3, 4, 5, & 6	12804.0	-	12804.0	4780.0	-	4780.0	8024.0	-
Channel Improvement	505.0	-	505.0	155.0	-	155.0	350.0	-
Flood Plain Preserves	3500.0	-	3500.0	-	-	-	3500.0	-
GRAND TOTAL	17315.6	10966.7	28282.3	5409.7	5248.7	10658.4	11905.9	5718.0
1/ Price base - 1973								

Date June 1974

TABLE 2B - RECREATIONAL FACILITIESSTRUCTURE 1
ESTIMATED CONSTRUCTION COSTS

Upper Salt Creek Watershed, Illinois

(Dollars) 1/

Item	Number & Unit	Est. Unit Cost	Total Constr. Cost
<u>COST SHARED FACILITIES</u>			
Parking area & drives (asphalt)	193,240 sq. yds. <u>2/</u>	15	2,898,600
Parking area (10' x 18')	2,750 autos		
Drive (24' wide)	52,150 ft <u>2/</u>		
Landscaping			240,300
Includes road side seeding, tree planting and signs			
Picnic shelters	19 each	16,000	304,000
Steel & masonry (40' x 50')			
Comfort stations	20 each	57,000	1,140,000
Masonry construction flush type (22' x 48')			
11 fixtures each sex			
4 lavatories each sex			
Sanitary sewers	38,800 ft <u>2/</u>	11	426,800
Includes lift stations & manholes			
Electrical Service	33,700 ft <u>2/</u>	2	67,400
Includes transformers			
Water wells	36 each	1,000	36,000
10" dia. hand pump			
Picnic tables	3,640 each	30	109,200
Boat launching ramps	2 each	50,000	100,000
2 lane concrete			
Fishing walls	6 each	12,000	72,000
Sheet piling 300' long			
Trails	10 miles <u>2/</u>	50,000	500,000
Asphalt surface 8' wide			
Nature trails	8,000 ft <u>2/</u>	5	40,000
Gravel or wood chip surface 8' wide			

(CONTINUED)

TABLE 2B - RECREATIONAL FACILITIES (Continued)

Item	Number & Unit	Est. Unit Cost	Total Const. Cost
Boat dock	300 ft	60	18,000
Subtotal - Cost Shared Facilities			5,952,300
Contingencies			717,700
TOTAL-COST SHARED FACILITIES			6,670,000
NON-COST SHARED FACILITIES <u>4/</u>			
Parking area (asphalt)	10,400 sq. yds. <u>2/</u> 520 autos	15	156,000
Comfort station <u>3/</u>	1 each	57,000	57,000
Sanitary sewers Includes lift stations & manholes	2,400 ft <u>2/</u>	11	26,400
Electrical Service Includes transformers	2,400 ft <u>2/</u>	2	4,800
Service and Concession Building, masonry construction	1 each	40,000	40,000
Diversion Canal and Pond Development, earth excavation	72,000 cu. yds.	1	72,000
Winter sports hill development Starter bldg/warming shelter toboggan slides, landscaping	1 job	250,000	250,000
Subtotal - Non-Cost Shared Items			606,200
Contingencies			73,800
TOTAL - NON-COST SHARED FACILITIES <u>4/</u>			680,000

1/ Price base - 19732/ Estimated quantity, subject to minor variation at time of scheduled planning.3/ Same as under cost shared items4/ Non-project costsDate May 1973

FILL TYPE STRUCTURES WITH PLANNED STORAGE CAPACITY

Upper Salt Creek Watershed, Illinois

ITEM	UNIT	STRUCTURE NUMBER			TOTAL
		1	2	3	
Class of Structure		C	C	C	
Drainage Area(Uncontrolled)	Sq. Mi.	29.74	2.24	3.86	35.84
Controlled	Sq. Mi.	20.61	--	--	
Curve No. (1 Day) (AMC 11)		78	80	75	
Tc	Hrs.	24.0	4.08	4.10	
Elevation Top of Dam	Ft.	698.5	758.0	750.0	
Elevation Crest Emerg Spillway	Ft.	691.0	752.5	741.0	
Elevation Crest High Stage In-					
let	Ft.	686.0	747.0	730.0	
Elevation Crest Low Stage Inlet	Ft.	---	---	---	
Maximum Height of Dam	Ft.	22	22	25	
Volume of Fill	Cu.Yds.	40,000	32,400	110,700	183,100
Total Capacity 1/	Ac.Ft.	7,036 2/	301	447	7,784
Sediment Submerged 100 Yrs.	Ac.Ft.	284	37	39	360
Sediment Aerated	Ac.Ft.	23	2	3	28
Recreation	Ac.Ft.	2519 1/	--	--	2,519
Retarding	Ac.Ft.	4210	262	405	4,877
Surface Area					
Sediment Pool 3/	Acres	(221)	23	14	258
Recreation	Acres	589 4/	--	--	589
Retarding Pool	Acres	1290	77	78	1,445
Principal Spillway					
Rainfall Volume (areal)					
(1 day)	In.	5.7	5.7	5.7	
Rainfall Volume (areal)					
(10 day)	In.	10.1	10.1	10.1	
Runoff Volume (10 day)	In.	5.25	5.65	4.74	
Capacity of Low Stage (Max)	cfs	--	--	--	
Capacity of High Stage(Max)	cfs	2650	174	230	
Frequency Operation-Emer Spw	% Chance	1.0	1.0	1.0	
Size of Conduit	Dim.	Weir	3.50	4.00	
Emergency Spillway					
Rainfall Volume(ESH)(areal)	In.	12.10	9.6	9.6	
Runoff Volume (ESH)	In.	9.27	7.14	6.51	
Type		Veg 5/	Veg	Veg	
Bottom Width	Ft.	2 @ 350	140	125	
Velocity of Flow (Ve)	Ft/Sec	8.0	7.5	8.6	
Slope of exit channel	Ft/Ft	0.03	0.04	0.03	
Maximum Water Surface Elev.	Ft.	694.5	754.6	744.4	

CONTINUED

TABLE 3 - STRUCTURAL DATA (continued)

ITEM	UNIT	STRUCTURE NUMBER			TOTAL
		1	2	3	
Freeboard					
Rainfall Volume (FH) (areal)	In.	31.24	24.8	24.8	
Runoff Volume (FH)	In.	28.12	22.03	21.20	
Maximum Water Surface Elev.	Ft.	698.5	757.8	749.5	
Capacity Equivalents					
Sediment Volume	In.	.19	.30	.18	
Retarding Volume	In.	2.65	2.19	1.97	

1/ Crest of Emergency Spillway.

2/ Includes 1,540 acre feet of storage provided by dredging (1,469 for recreation and 71, incidentally, for retarding).

3/ Area shown in () if reservoir contains beneficial storage.

4/ Main pool (Elev. 686) is 419 acres; lateral pools (Elev. 688) are 146 and 24 acres.

5/ Reinforced concrete control section.

Date May 1973

TABLE 3A - STRUCTURE DATA

PIT TYPE STRUCTURES WITH PLANNED STORAGE CAPACITY

Upper Salt Creek Watershed, Illinois

ITEM	UNIT	STRUCTURE NUMBER			TOTAL
		4	5	6	
Class of Structure		C	C	C	
Drainage Area	Sq. Mi.	3.64	5.56	5.31	14.51
Controlled	Sq. Mi.	5.56	--	--	
Curve No. (1 day) (AMC 11)		80	75	75	
Tc	Hrs.	1.3	4.2	3.0	
Elev. Maximum inflow watersurface	Ft.	716.5	748.5	748.5	
Elev. Crest diversion weir	Ft.	709.5	742.4	743.5	
Elev. Crest bypass channel orifice	Ft.	705.5	740.4	742.5	
Elev. sediment pool	Ft.	680	705	691.5	
Elev. retarding pool	Ft.	709.5	742.4	743.5	
Volume of pit excavation	Cu. Yds.	150,000	820,000	1,100,000	2,070,000
Total capacity	Ac.Ft.	498	623	649	1,770
Sediment submerged 100 years 1/	Ac.Ft.	33	73	74	180
Retarding	Ac.Ft.	465	550	575	1,590
Surface Area					
Sediment pool	Acres	8.6	9.0	5.4	23.0
Retarding pool	Acres	23.2	17.6	14.7	55.5
Spillway					
Rainfall Vol.(area) 2/					
1-day	In.	5.7	5.7	5.7	
10-day	In.	10.1	10.1	10.1	
Runoff Vol 10-day	In.	5.6	4.71	4.70	
Capacity bypass channel orifice (Max)	cfs	513	290	295	
Capacity diversion weir (Max)	cfs	1370	1220	1150	
Size bypass channel orifice	Ft x Ft	1.5x20	2.0x10	1.0x23	
Diversion weir length	Ft.	25	30	30	
Dewatering pumps (Inclined screw)					
Head	Ft.	30	40	40	
Power required	HP	240	300	320	
Capacity	cfs	36	50	48	
Capacity equivalents					
Sediment volume	In.	.17	.24	.26	
Retarding volume	In.	2.39	1.85	2.03	

1/ Accumulation of aerated sediment considered insignificant.

2/ 1 percent chance storm.

Date May 1973

TABLE 3B - STRUCTURAL DATA

CHANNELS (REACH F)

Upper Salt Creek Watershed, Illinois

Approx Length	Drain-Capacity age (CFS)		Energy Gradient		Channel Dimensions			"n" Value Velocities				Excavation Volume (Cu.Yds.)
	1/	2/	As Built 3/	Aged 2/	As Built 3/	Bottom ft.	Side Slopes H:V	Depth (ft) As Built 3/	Aged 2/	As Built 3/	Aged 2/	
Outlet	10.71	4,033	1,863	--	--	30	2.5:1	4/	10.8	6.6	.028	
820	10.07	3,948	1,812	.0009	.0016	30	2.5:1	4/	11.4	6.4	.028	
1,160	9.80	3,940	1,806	.0011	.0016	30	2.5:1	4/	10.6	6.4	.028	
1,940	9.59	3,889	1,763	.0013	.0018	30	2.5:1	4/	10.3	6.3	.028	
690	9.39	3,850	1,730	.0006	.0012	6/	6/	11.5	6.4	4.4	.028	
2,740	4.55	1,347	834	.0018	.0018	76	1.5:1	6.4	4.4	4.4	.030	
1,240	4.51	1,341	832	.0009	.0017	26	1.5:1	5.7	4.5	4.5	.030	
1,050	4.36	1,304	820	.0010	.0018	26	1.5:1	6.3	4.4	4.4	.030	
TOTAL 7/												94,060

1/ Drainage area not controlled by structures.

2/ 100-year frequency discharge w/project and projected watershed conditions.

3/ 10-year frequency discharge w/project and present watershed conditions.

4/ Represents average side slope for downstream 3,920 feet. For details of this portion of Reach F, see Plate No. 1.

5/ Riprap will be provided to control channel erosion caused by high velocities.

6/ Wetted perimeter (ft.) 229 2/ - 182 3/

7/ Flow area (sq. ft) 1,153 2/ - 1,081 3/

7/ Type of work: 11 - Enlargement of existing channel or stream. Type of channel before project: N - An unmodified, well defined natural channel or stream. Flow condition before project: 1 - Intermittent - continuous flow through some seasons but little or no flow through other seasons.

DATE: May 1973

TABLE 4 - ANNUAL COST

Upper Salt Creek Watershed, Illinois
(In Thousands of Dollars) 1/

Evaluation Unit	Installation Cost <u>2/</u>	Maintenance <u>3/</u>	Total
Structural Measures	1597.7	781.4	2379.1
Project Administration	147.0		147.0
GRAND TOTAL	1744.7	781.4	2526.1

1/ Price base - 1973

2/ 100-years @ 5 5/8 percent interest.

3/ Price base - adjusted normalized prices. This includes \$593.6 for the operation, maintenance, and replacement of recreation facilities.

Date June 1974

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Upper Salt Creek Watershed, Illinois
(In Thousands of Dollars) 1/

Item	Estimated Average Annual Damage		Damage Reduction Benefit
	Without Project	With Project	
Floodwater Damage			
Residential	643.8	93.2	550.6
Business and Industrial	110.5	-	110.5
School and Church	1.7	.3	1.4
Subtotal	756.0	93.5	662.5
Indirect	201.3	23.5	177.8
TOTAL	957.3	117.0	840.3

1/ Price base - adjusted normalized prices.

Date June 1974

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Upper Salt Creek Watershed, Illinois
(In Thousands of Dollars) 1/

Evaluation Unit	Damage 2/ Reduction	Recreation 3/	Other 4/	Secondary Benefits	Total	Average 5/ Annual Costs	Benefit Cost Ratio
Structural Measures	825.3	2126.5	141.0	363.1	3455.9	2379.1	1.5:1.0
Project Administration						147.0	
GRAND TOTAL	825.3	2126.5	141.0	363.1	3455.9	2526.1	1.4:1.0

1/ Price base - 1973

2/ In addition, it is estimated that land treatment measures will provide benefits of \$15,000 annually.

3/ Incidental recreation of \$180,000 are included.

4/ Consists of savings of costs for planned downstream channel improvement measures.

5/ From Table 4.

Date June 1974

INVESTIGATION AND ANALYSES

Hydrologic and Hydraulic

The evaluation model was set up using parameters which reflect projected watershed buildup. This projection represents an average future watershed condition, hereafter referred to as the without-project condition. The with-project condition assumes the same projections but includes the structural works of improvement. A description of the parameters follows:

(1) Precipitation -- U. S. Weather Bureau Technical Papers 40 and 49 were used to estimate point rainfalls for various durations and frequencies. The following table summarizes the various rainfalls used during project evaluation and structure design.

Storm Duration	<u>Frequency of Occurrence</u>						Probable Maximum
	<u>1 yr.</u>	<u>2 yr.</u>	<u>5 yr.</u>	<u>10 yr.</u>	<u>25 yr.</u>	<u>100 yr.</u>	
6 hour	1.8	2.1	2.6	3.0	3.4	4.2	24.8
18 hour	---	---	---	---	---	---	30.7
24 hour	2.4	2.8	3.5	4.0	4.7	5.7	31.3
10 day	---	---	---	---	---	10.1	---

The storm distribution used in the evaluation model produces a typical flood hydrograph ideal for developing flood profiles of uniform frequency. Plate 2 shows a plotting of this storm distribution.

(2) Runoff -- Studies of storm runoff events recorded on stream flow gauges operating in eight nearby watersheds indicate an average rainfall versus runoff relationship can be developed for this area. Plate 3 shows the results of this study. However, due to the fact that many areas within the Upper Salt Creek Watershed can be classified as noncontributing at the present time, a second curve was developed for use in areas where projections showed substantial reductions or complete elimination of these noncontributing depressional areas. This curve is also shown on Plate 3.

(3) Time of Concentration -- Agricultural times of concentration were computed for each of the 82 subhydrologic units included in the watershed evaluation model. Each agricultural time of concentration was in turn adjusted by a factor which reflects the projected urbanization in that subwatershed. The following table shows the four major types of development predicted and the adjustment factor for each type of development.

Type of Development	Percent Impervious	Percent Storm Sewered	Time of Concentration Adjustment Factor 1/
Mature	40	80	.1
Moderate	30	60	.2
Diverse	20	40	.3
Estate	10	20	1.0

1/ U. S. Geological Survey Circular 554.

Plate 4 shows the effect of urbanization on peak rates of runoff.

(4) Channel Rating -- Assumptions on channel sizes and capacities for the without-project evaluation are extremely complex. Some of the complicating factors are (a) random but often significant flood plain modifications, (b) uncoordinated planning and construction of channel modifications, and (c) an active road building program which causes both modification and new construction of bridge openings and road crossings. Therefore, the following policy was developed as a reasonable approach to resolving these uncertainties.

Where public entities have planned and/or funded flood plain modifications, channel improvements, or road crossings these modifications were considered in place. In all other evaluation areas the without-project condition was assumed to be the same as the present condition. Since damages and damageable values have steadily increased in spite of these non-coordinated improvements, this assumption will in all probability neither inflate the watershed problems nor minimize them.

Hydraulic Computations

Sixty-four valley cross-sections were surveyed with vertical control tied to mean sea level datum and additional 34 cross-sections were secured from the Illinois Division of Waterways in the areas where they have planned channel improvement. The locations of these valley sections were selected in order to (1) accurately develop flood profiles and (2) develop discharge versus velocity information to be used in the project evaluation model. Stage discharge relationships were developed for each evaluation area by running successive water surface profiles for a wide range of discharge rates. Head losses from bridges, culverts, and over-topped roads were included in these computations.

Without-Project Flood Routing

The watershed evaluation model was set up in SCS Technical Release-20. This computer program was used to route each of the evaluation storms through the watershed.

Flood profiles were then developed and the economist was able to evaluate damages by comparing flood profile elevations at various frequencies with the damageable values within the flood plain.

With-Project Flood Routing

Floodwater retarding structures 1, 2, 3, 4, 5, and 6 were inserted into the watershed evaluation model. Flood profiles were again developed and the remaining damages evaluated. Where channel improvement was determined to be the only practical means of further flood damage reduction, preliminary designs were made and these revised stage discharge curves were in turn inserted into the model. A final set of flood profiles were developed, evaluated, and determined to be satisfactory.

Engineering Surveys

Vertical control lines were run throughout the watershed with bench marks established at or near each structure site and at all roads crossing the major tributaries. All surveys were referenced to mean sea level datum.

Channel cross-sections and valley sections were surveyed where necessary to define the topography and the shape of the channel in detail.

Most of the engineering surveys needed for watershed planning were made with funds provided by the Metropolitan Sanitary District of Greater Chicago. These funds supplied the needed services and personnel to accomplish the work in the desired time.

All topographic maps were developed with a maximum contour interval of 2 feet for structure and reservoir areas.

Structure Design and Cost Estimates

The three excavated storage-pump discharge structures 4, 5, and 6 were designed and cost estimates completed through an engineering services contract between the Soil Conservation Service and Bauer Engineering, Inc., Engineering Consultants, Chicago, Illinois. Bauer Engineering provided preliminary plans and cost estimates for three alternative conditions. Their studies included cost estimates for various methods of disposal of excess excavated material and alternative sources of power. They also provided operation, maintenance, and replacement costs based on a project life of 100 years.

Structures 1, 2, and 3 are planned with single-stage principal spillways, with release rates equal to approximately one-half of the downstream channel capacity. Crests of the inlets are set at the 100-year sediment pool elevation.

All necessary hydrographs were routed through the structures by use of a computer and the Soil Conservation Service dams program. The structure routings were used to determine (1) the required volume of temporary storage, (2) the crest elevation of the emergency spillway, (3) the required dimensions of the emergency spillway, and (4) the elevation of top of dam. The total volume for floodwater storage was determined by using the 100-year frequency storm of a 10-day duration. The downstream channel capacities were used to determine the maximum principal spillway release rates.

Planning designs were based on criteria and procedures contained in Engineering Memorandum SCS-27, SCS Technical Release-2, Chapter 21 of the Hydrology Guide, and Technical Papers 40 and 49 of the U. S. Department of Commerce, Weather Bureau.

Costs for adequate drainage system and reservoir drain valves, conduit and inlet appurtenances were included for structures 1, 2, and 3. An allowance of 5 percent for additional embankment was also included to allow for consolidation.

The elevation and area of the recreation lake were selected by the Cook County Forest Preserve District. The preliminary plan and estimated cost for the basic recreation facilities were developed by the Forest Preserve District.

Cost estimates were based on unit prices on current construction in the watershed area. Details of quantities, costs, and design features are listed in Tables 1, 2, 2A, and 3 of this plan.

Channel Design and Cost Estimates

Alignment for channel improvement was located on aerial photos. Using the 100-year with-project discharges supplied by the hydraulic engineer, soils information supplied by the geologist, and SCS Technical Release-25, a preliminary channel design was determined. The hydraulics were then analyzed using the SCS Water Surface Profile Program. The results of this analysis are summarized in Table 3A. A riprap lining was necessary on the lower 3,920 feet of the new channel due to the presence of sand. (See Plate 1).

Channel cost estimates were computed using current prices for similar work. Also included are land rights, seeding, bridge modifications, utility relocations, and engineering costs.

Geology

Erosion

A study of erosion in the watershed was conducted using aerial photographs and recent soils and land use information as reference material. The experience of field personnel and information supplied from erosion studies in similar rapidly expanding urban areas were also utilized. The estimated per acre average annual soil loss by broad land use category is given below:

<u>Land Use</u>	<u>Mean Annual Soil Loss Tons/Acre/Year</u>
Construction sites	70
Undeveloped land including agricultural	2
Developed land including residential, industrial, etc.	0.25
Forest Preserve	0.20
Swampland	0

Reservoir Sedimentation

Sediment storage requirements and pool allocation for the six proposed floodwater retarding structures were estimated in accordance with SCS Technical Release-12 and Engineering Memorandum SCS-27. The annual gross erosion for each subwatershed was estimated using current land use statistics and soil erosion information. Allowances for future changes in gross erosion caused by anticipated changes in land use were made. In each case a schedule relating gross erosion and projected rate of land development was prepared. It is estimated that 85 percent of the sediment accumulation will occur during the initial 50 years of the project life. This is a result of the relatively high sediment yield associated with construction activity which will occur as the watershed is developed. Sediment yields were obtained by multiplying gross erosion by an appropriate sediment delivery ratio estimated from existing curves with modifications made for effects of topography.

The trap efficiency of each proposed valley storage retarding structure was estimated to 95 percent. The trap efficiency of each gravity storage site was estimated to be 85 percent reflecting lesser detention time and by-pass flow. A submerged unit weight of 50 pounds per cubic foot was used for calculating below water line sediment storage volumes. An aerated unit weight of 70 pounds per cubic foot was used for calculating above permanent water line sediment storage volumes. No aerated sediment storage is provided in structures 4, 5, and 6 as indicated in Table 3A. Aerated sediment accumulating on the pit wall surfaces will be washed by normal precipitation down the relatively steep pit slopes into the sediment pool and thus finally

accumulate as submerged sediment after a short time. Mean annual sediment accumulation, based on a 100-year project life, ranged from 0.072 acre-feet per drainage area square mile for site 1 to 0.163 acre-feet for site 2.

Structure Sites

Each of the six retarding sites was investigated in accordance with procedures outlined in Engineering Memorandum SCS-33 and SCS National Engineering Handbook, Section 8. Aerial photographs, USGS topographic maps, published engineering and geologic reports, and soil survey information were sources of basic data for the investigation. Boring logs made available by the Illinois Division of Highways, Illinois State Toll Highway Authority, Illinois Division of Water Resource Management, Metropolitan Sanitary District, and Cook County Forest Preserve District were also valuable sources of information. Five or six proposed retarding sites were investigated by use of a Service-owned Mobile B-61 drill rig and supplementary manual borings during the period March through May 1970. Site 6 was investigated by Illinois Drilling and Testing Company under contract with the Metropolitan Sanitary District during 1968. This investigation was considered adequate for planning design purposes and generally satisfied the criteria in the above mentioned publications. Site 1 had also been investigated in a preliminary manner by various agencies prior to 1970. Additional borings were made at this site for the purpose of clarifying the foundation stratigraphy established in the earlier investigations.

All subsurface materials were field classified according to the Unified Soil Classification System. Several samples were laboratory analyzed as a check on the field classification. Genetic terms were applied to subsurface materials for purposes of correlation of known properties of these materials between sites.

The following are brief descriptions of the geologic conditions at each site:

Site 1

The flood plain surface is underlain by up to 20 feet of alluvium consisting of permeable sand and gravel and a thin surficial layer of less permeable silty and clayey material. Underlying the alluvium is unweathered till consisting of stiff low plasticity silty clay. The abutments are composed of weathered till with properties similar to those of the till underlying the alluvium. Both types of till are essentially impervious. A stratum of sand from 2 to 4 feet thick is present in the till of the right abutment. Till is available from each valley surface upstream from the proposed centerline for use in construction of the embankment.

Site 2

The site area is underlain by impermeable weathered till consisting of stiff low plasticity silty clay. Deposits of soft organic rich paludal material (deposited in a swamp environment) are present beneath the proposed dam in two relatively small areas and reach a maximum thickness of 10 feet. Borrow material consisting of till is available adjacent to the site.

Site 3

Approximately 500 feet of the proposed embankment, the area adjacent to the channel, is underlain by 10 feet of very soft organic rich paludal deposits. The high compressibility and low shear strength of this material may require special design considerations. The abutments are composed of a 5-10 foot upper zone of weathered till consisting of stiff low plasticity silty clay overlying unweathered till of similar properties which also extends beneath the paludal deposit. Thin lenses of silt, sand, and gravel occur in the till. Borrow material for constructing the embankment is available from portions of the pool area and other locations adjacent to the site.

Site 4

The foundation conditions at site 4 are rather complex. The area around the east pit is underlain by deposits of permeable sandy and gravelly outwash and stiff impermeable till consisting of low plasticity silty clay. Small areas are also covered by up to 10 feet of soft material consisting of organic rich paludal sediment and lacustrine silty clay. A deposit of this material up to 18 feet thick extends into the area surrounding the west pit. Bedrock was not encountered in any of the borings which were advanced a maximum of 50 feet below the surface. The total ground water inflow for both pits is estimated to be 400,000 gallons per day.

Site 5

The foundation conditions at site 5 are also complex. Stiff impermeable till consisting largely of low plasticity silty clay lies beneath varying thicknesses of soft paludal and lacustrine sediments and outwash consisting of permeable sand and gravel. The depth to till ranges from 30 feet in the southwest quarter of the site area to zero feet near the east and south margins.

A maximum of 15 feet of soft organic rich paludal sediment and lacustrine silty clay is present over till and outwash in the southwest quarter adjacent to Salt Creek. Ground water seepage into the pit is estimated at 200,000 gallons per day.

Site 6

Borings at site 6 penetrated a maximum of 42 feet of till similar to that at the other sites. No bedrock was encountered. The till at this site is essentially impervious with the exceptions of minor lenticular inclusions of sand and gravel. Groundwater flow into the proposed storage pit is estimated to be in the range of from 50,000 to 200,000 gallons per day. No extensive deposits of outwash or soft sediments are present at this site.

Channel

Channel improvement was considered in several reaches prior to final project formulation. These reaches were investigated according to criteria given in SCS Technical Release-25, "Planning and Design of Open Channels". A total of 10 power borings and 6 manual borings were made in order to determine the stratigraphy along the proposed improvement reaches. Five of these borings were made in Reach F, the final project formulation improvement reach. Several samples from Reach F were laboratory tested to obtain numerical design input data.

The proposed channel in Reach F, like the existing channel, will be cut alternately in till consisting of stiff low plasticity silty clay and in swamp deposits and alluvium consisting of predominantly soft low plasticity silty clay and sand-silt mixtures respectively. The till is the most stable material in regard to high velocity channel flow followed by the silty clay swamp deposits. The sand-silt mixtures are the least stable and will require special channel protection.

Additional investigation including sampling in borrow areas, correlation drilling, and obtaining undisturbed samples in critical and problem foundation areas will be conducted prior to final design and construction. A thorough program of laboratory testing will also be required for both channel stability analyses and embankment design considerations.

Economics

Floodwater Damage -- Residential (Present Development)

Damages to home furnishings, personal effects, and costs for cleaning and repairs constitute the bulk of floodwater damages in Upper Salt Creek Watershed. The extent and type of damage varies greatly depending upon the type of home and its location within the flood plain.

Major types of homes within the flood plain with reference to lowest level elevation are basement homes, split-level (or

tri-level) homes, bi-level raised ranch homes, and crawl space homes. Engineering surveys were made to determine first floor and/or basement window or other pertinent elevations on more than 1,250 homes upstream from the junction of Salt Creek Branch and the Arlington Heights Branch channels.

Split-level homes have a lower level floor approximately $4\frac{1}{2}$ feet below first floor, or in most instances, an equivalent to 3 feet below ground level. These homes have an additional level directly above the lowest level or about 4 feet above and to the left or right of the ground floor level. Most of these dwellings were built in the period between 1957 - 1962 and have an average current market value of about \$32,000.

Bi-level raised ranch homes are characterized by a depressed driveway to a basement or lower level double garage. Basement (garage) floor level in most instances is about $1\frac{1}{2}$ feet below the sidewalk elevation.

The bi-level home has additional living space (2 rooms, bath, and laundry area) on a floor level 6 to 10 inches above the garage floor. The front door opens to a landing with steps leading down to the lower levels and up to the "raised" level. Most of these homes were built from 1960 - 1965 and have an average current market value of about \$34,000.

Basement and crawl space homes vary greatly as to lot size and whether they are one or two story buildings. Current market values vary from less than \$25,000 in older sections of Palatine to as much as \$60,000 or more in the Plum Grove Estates area immediately upstream from Rohlwing Road.

Three local people aided in the distribution of approximately 150 damage survey or interview forms to individual homeowners in the Arlington Heights Branch flood plain area. The planning staff economist subsequently checked with the homeowners involved to (1) review the items recorded; i.e., the depth of damage recorded and damages sustained or (2) obtain this data from the interviewee. Interview data from approximately 90 homeowners were obtained in this manner.

A previous flood damage survey conducted by an informal homeowner's group in the Salt Creek Branch flood plain area following the June 1967 flood was also reviewed. Ten individual respondents to this survey were interviewed to verify the survey's findings.

Data from interviews and the June 1967 flood-damage survey were used to estimate depth-damage relationships for the basement, split-level, and bi-level raised ranch homes. This was accomplished by the use of a multiple-regression program from the University of Illinois Digital Computer Library.

Stages of flooding by reach and by frequency of flood occurrence were estimated in consultation with the planning staff hydrologist. Depth of flooding and dollar damage by frequency for without-project and with-project conditions were determined for each home affected.

A total of 688 homes are estimated to be subject to floodwater damage by the 100-year frequency flood under without-project conditions in the Arlington Heights Branch (Winston Park Subdivision) flood plain area. (See Flood Plain Map 3A.) Flooding is limited to basements and the lower levels of split-level and bi-level ranch homes and varies from depths of less than one foot to more than 7 feet for the 100-year frequency flood under without-project condition.

Without-project condition in the aforementioned area is assumed to be with the proposed State of Illinois, Division of Waterways' channel improvement measures installed downstream from U. S. 14. This would result in 100-year frequency flood stages approximating those experienced during the June 1967 flood.

About 65 percent of the average annual damage in the Arlington Heights Branch area is to an estimated 310 bi-level raised ranch homes. Damages are caused primarily by local street drainage "pouring" in over the sidewalk level; minor damage is caused by "backup" of sanitary sewers.

Damages to the other homes in this area consist in the main of basement flooding caused by either seepage, or in most instances, from "backup" of sanitary sewers. A review of village of Palatine sewer location maps indicates a separate storm and sanitary sewer system in this area.

It is believed that the sanitary sewers are overloaded during flood peaks because (1) some foundation and downspout drains are connected to the sanitary sewers, (2) water in the street enters sanitary sewer manholes, and (3) the additional load caused by inflow of local surface drainage into the basement garages of the bi-level raised ranch homes. The latter is believed to be the more important problem and could perhaps be partially solved by either (1) installing more storm sewer inlets and/or (2) replacing some portions of existing storm sewer lines with larger sewers.

Average annual direct damages for without-project conditions in the Arlington Heights Branch area total \$64,500. The current market value of these homes is estimated to be \$24,350,000. Direct average annual damage (without-project) is equivalent to 0.25 percent of the current market value of the 688 homes damaged by the 100-year frequency flood.

Damages to residential property located outside of the evaluated area but within the estimated 100-year frequency flood plain area are estimated to be \$12,900. This would increase total direct damages in this area to \$77,400.

Damages in the Salt Creek Branch flood plain area are much more extensive than in the Winston Park area and are more difficult to define. Problems encountered in the analysis were (1) the marked difference in home values, (2) the difference in sanitary facilities; i.e. septic fields, sanitary sewers, and combined (sanitary-storm) sewers within the area, (3) the use of projected flood stages based on continued upstream development with increased runoff, and (4) effects of probable future flood proofing measures.

About 52 homes immediately upstream from the junction of the Arlington Heights Branch and downstream from Rohlwing Road are subject to flood damage. (See Flood Plain map 5A.) Most of these homes have basements and are considered subject to backup from sanitary sewers.

Basement flooding depths are estimated to vary from less than one foot to more than four feet deep for the 100-year frequency flood under without-project conditions. The current market value of these homes is estimated to average \$37,500; total market value would be \$1,987,500.

Direct average annual damages under without-project conditions total \$24,400 or 1.2 percent of current market value. Proposed project measures will provide a 100-year level flood protection in this area.

An additional 21 homes upstream from Rohlwing Road (Illinois Route 53) to Old Plum Grove Road have flooding problems. This unincorporated area, known as Plum Grove Estates, consists largely of homes on lots greater than one acre in size.

Nearly all of the homes have basements which are drained by sanitary sewers. Interviews in this area indicated 4 to 5 foot depth basement flooding from the June 1967 flood was caused entirely by seepage and/or water actually breaking through basement windows.

It is assumed that flooding in this area will occur only at flood stages higher than 2 feet below first floor elevation, or at the top of the basement window well (ground level). Flooding at these stages is estimated to cause basement flood depths of 5 feet or more.

Homes in this area are estimated to have a current market value of \$60,000. Total current market value of the 21 homes would be \$1,260,000.

Eleven homes in the sparsely developed and largely unincorporated area upstream from Old Plum Grove Road to Illinois Avenue have flooding problems. See Flood Plain map 2A. Home values vary greatly in this area but are estimated to average \$30,000 for a total value of \$330,000.

Homes in this area are largely served by septic fields. Flood damage estimates were based on the same assumption used in the Plum Grove Estates area.

Total direct average annual damages for combined areas upstream from Rohlwing Road to Illinois Avenue total \$30,800. This is equivalent to 1.9 percent of the estimated \$1,590,000 market value.

Homes subject to flooding upstream from Illinois Avenue total 290 in number. See Flood Plain map 1A. About 170 of these homes, primarily in the downstream portion of the area, are mostly split-level or basement type homes with an estimated average value of \$30,000. The remaining 120 homes are mostly basement and crawl space type; their current average value is about \$25,000.

Homes in this area are subject to backup from sanitary or combined (sanitary-storm) sewers as indicated by interviewee comment on the time required to thoroughly clean the basements or lower levels of the tri-level homes following floods. Average annual damages in this area are estimated to be \$157,800 or an equivalent 1.9 percent of the current \$8,100,000 market value.

Estimates of average annual damages for both with and without-project conditions in the Salt Creek Branch area are based on the installation of flood proofing measures to prevent chronic basement flooding. An estimated 30 homes in the area upstream from Illinois Avenue now have cutoff valves to prevent backup from basement flood drains.

It is believed that additional homeowners would install cutoff valves, flood proof basement windows, or other flood proofing measures to prevent frequent flooding. These measures are (1) assumed to cause an 80 percent reduction of 2-year frequency flooding and 100 percent protection from annual flooding and (2) treated as an associated cost. Direct average annual damages to homes under without-project conditions in the Salt Creek Branch area total \$213,000. This is equivalent to 1.82 percent of estimated market value of the homes damaged.

Eight apartment buildings immediately south of Route 62 are subject to floodwater damage. (See Flood Plain map 5A.) Without-project damages are estimated to be \$14,200.

Without-project direct damages to residential property in presently developed areas total \$304,600.

Floodwater Damage -- Business and Industrial (Present Development)

Two retail stores are located east of the Arlington Heights Branch on the north side of Route 14. Both stores had floodwater nearly up to the first floor in the June 1967 flood but experienced damages of about \$2,000 in the form of cleanup costs around the buildings and parking area. Direct annual damages to these stores is estimated to be \$300.

Floodwater Damages -- Schools and Churches

Playgrounds and public lots of three schools and two churches are located within the flood plain. Damages are estimated to be \$1,500 annually. Project installation will reduce annual damages to \$300.

Floodwater Damage -- Future Development

Without Project -- Estimates of future damage are based on complete development of open flood plain areas within the next 20 years. Development by area is based on existing zoning ordinances.

Areas of residential development will increase from 445 acres to 1,055 acres within the 20-year period. Average annual direct damages discounted to reflect a lag in accrual will increase from \$304,600 to \$573,800.

Business and industrial areas will increase by over 200 acres. Areas in question will probably be shopping centers for the most part, with about 10 percent of the developed area being occupied by buildings. Net average annual damages are estimated to increase from \$300 to \$98,500.

With Project

Damages to existing and projected residential and commercial areas will be reduced \$589,200 (from \$672,300 to \$83,100). Benefits will accrue from (1) actual reduction of damage to existing and future improvements (\$386,500) and (2) prevention of development in existing open areas (\$202,700).

Indirect Damage

Flooding has caused considerable inconvenience to families with split-level and bi-level homes. Areas used for bedrooms or family rooms are temporarily uninhabitable after flooding. When this happens frequently, families may relegate the lower level space to a lesser use, e.g., they may not replace damaged furnishings with items of equal quality and/or they may utilize this space as a storage area.

Lesser use of such space represents an economic loss to the homeowner. This factor is not thought to have had an effect on home sale values; however, it does, in some instances, alter the original plans of the owner as to the use of floor space.

Indirect damage to residential and business property and to schools and churches is estimated to be 20 percent of direct damage, or \$134,800. Additional indirect damages were determined based on costs for (1) redirection of traffic during flooding, (2) removal of debris from bridge and culvert openings, and (3) motorists' time and expenses while being delayed on major roads. Costs for the first item are estimated to be \$500 for highways, \$200 for major streets, and \$100 for minor streets.

Debris removal costs were based on interview with representatives of the Palatine Public Work Department and the Metropolitan Sanitary District. Costs for motorists being delayed, the major share of total damages, were estimated on the basis of traffic flow estimates from a Cook County traffic map. Indirect damages to traffic and roads and bridges total \$44,900 annually.

Total indirect damages are estimated to be \$179,700 for without-project conditions. Indirect damages will be reduced to \$21,500 under with-project conditions.

Savings in Planned Improvement

The State of Illinois, Division of Water Resource Management, has proposed channel improvement measures downstream from structure 1 to a point in the vicinity of Elmhurst. This agency's most recent (1968) estimate of costs for this improvement pointed out that a savings of \$800,000 could be attributed to the installation of a floodwater retarding structure in Ned Brown Forest Preserve.

The estimated savings was based on a reservoir having flood water storage capacity of 3,700 acre-feet. Structures 1, 2, 3, 4, 5, and 6 will have a combined flood water storage capacity of 6,467 acre-feet.

Estimated savings, adjusted to reflect (1) the 1970 construction cost index and (2) increased floodwater storage capacity would be \$2,476,800. Average annual benefits would be \$127,800. The Division of Water Resource Management concurred with this estimate.

Recreation

Annual visitor day attendance at the structure 1 recreational development is estimated to be 2,500,000. Approximately 1,610,000

visitor days is credited to the installation of the planned cost-shared facilities.

Net average annual benefits were based on (1) a value of \$1.50 per visitor day and (2) a discount to reflect a 10-year lag in accrual. Net benefits total \$1,946,500 annually.

The 5 single-purpose structures will provide an estimated 300,000 visitor days of recreation use. Net average annual benefits were based on (1) a value of \$0.75 per visitor day and (2) a discount to reflect a 10-year lag in accrual. The value of \$0.75 reflects the non-project cost for minimum facilities, operation, maintenance, and replacement. Net benefits from incidental recreation total \$180,000 per year.

Secondary Benefits

Secondary benefits are estimated to be 10 percent of (1) direct primary benefits and (2) associated costs and operation and maintenance costs. Benefits from these sources total \$280,800 and \$54,900, respectively; total benefits are \$335,700.

Prices and Interest Rates

Project installation costs were based on current costs and amortized at $5\frac{3}{8}$ percent interest over the 100-year project evaluation period. Projected damages and benefits were also discounted at this rate of interest. Associated costs were amortized at 6 percent over the expected useful life of the facility.

Floodwater damages and damage reduction benefits were adjusted to reflect (1) Department of Commerce, Office of Business Economics projections of future income and (2) Bureau of Labor statistics index for all commodities. These adjustments resulted in an index of 1.325.

Forest Land

Information on the hydrologic condition of the forest land and the reasons for the present condition was obtained from field observations and previously collected data. This information served as the basis for developing treatment needs for the forest land.

Forest fire protection, as provided by local fire protection districts, is considered adequate in that the area burned has not exceeded the watershed fire loss index goal of 0.2 percent of the area protected.

Fish and Wildlife

A fish and wildlife investigation was made on March 30, 1970, by biologists of Illinois Department of Conservation, Divisions of Fisheries and Game, and Soil Conservation Service. Information gained during this investigation has been augmented by data derived from continuing studies and surveys conducted by Illinois Department of Conservation.

UPPER SALT CREEK WATERSHED PROPOSED CHANNEL IMPROVEMENT

DEPTH IN FEET

TYPICAL CHANNEL SECTION
REACH F UPSTREAM 5720 FT.

CENTERLINE OF CHANNEL

BOTTOM WIDTH IN FEET (VARIABLE 26 TO 30 FEET)

DEPTH IN FEET

TYPICAL CHANNEL SECTION
REACH F DOWNSTREAM 3920 FT.

CENTERLINE OF CHANNEL

BOTTOM WIDTH IN FEET (30 FEET)

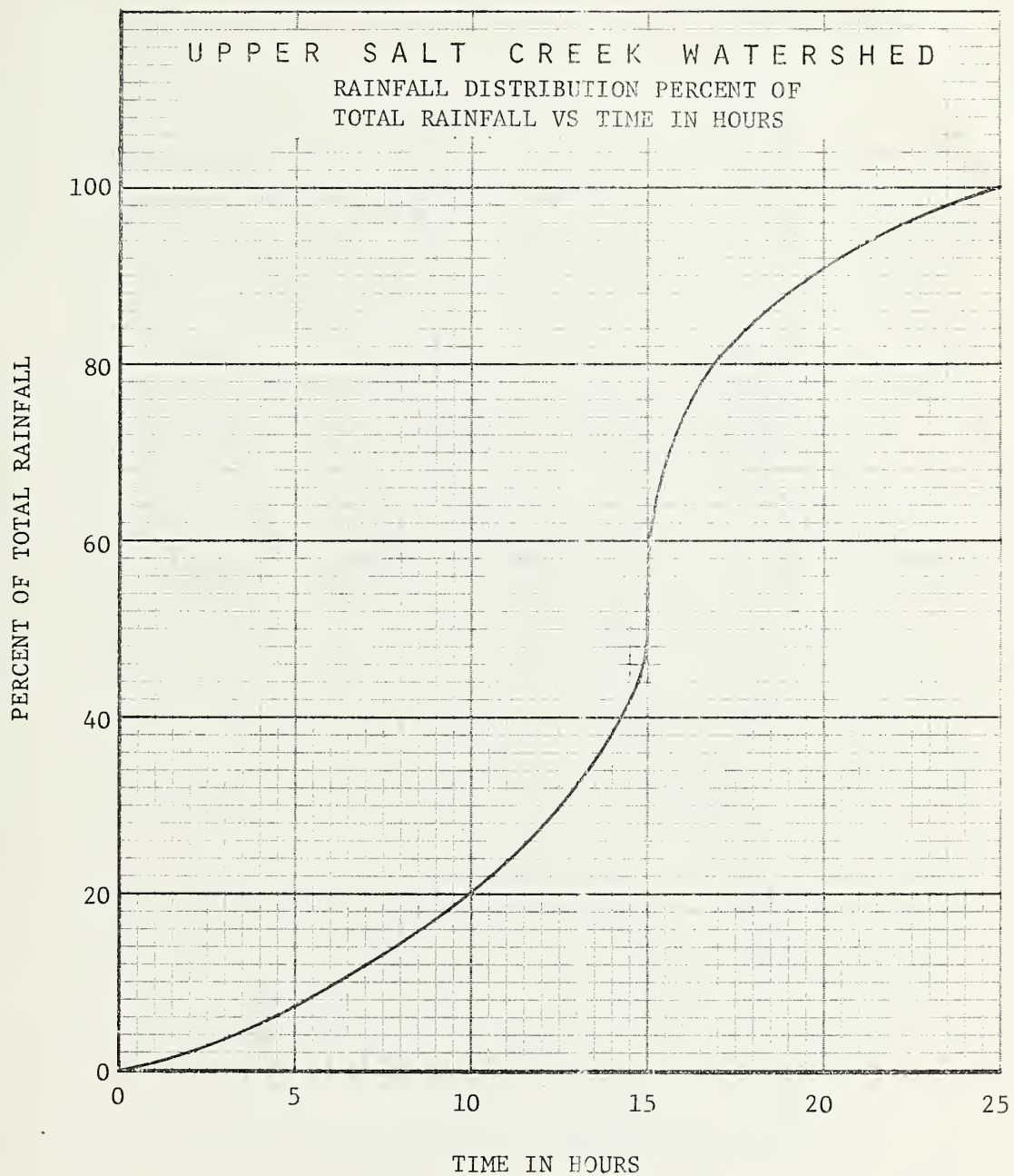
RIPRAP

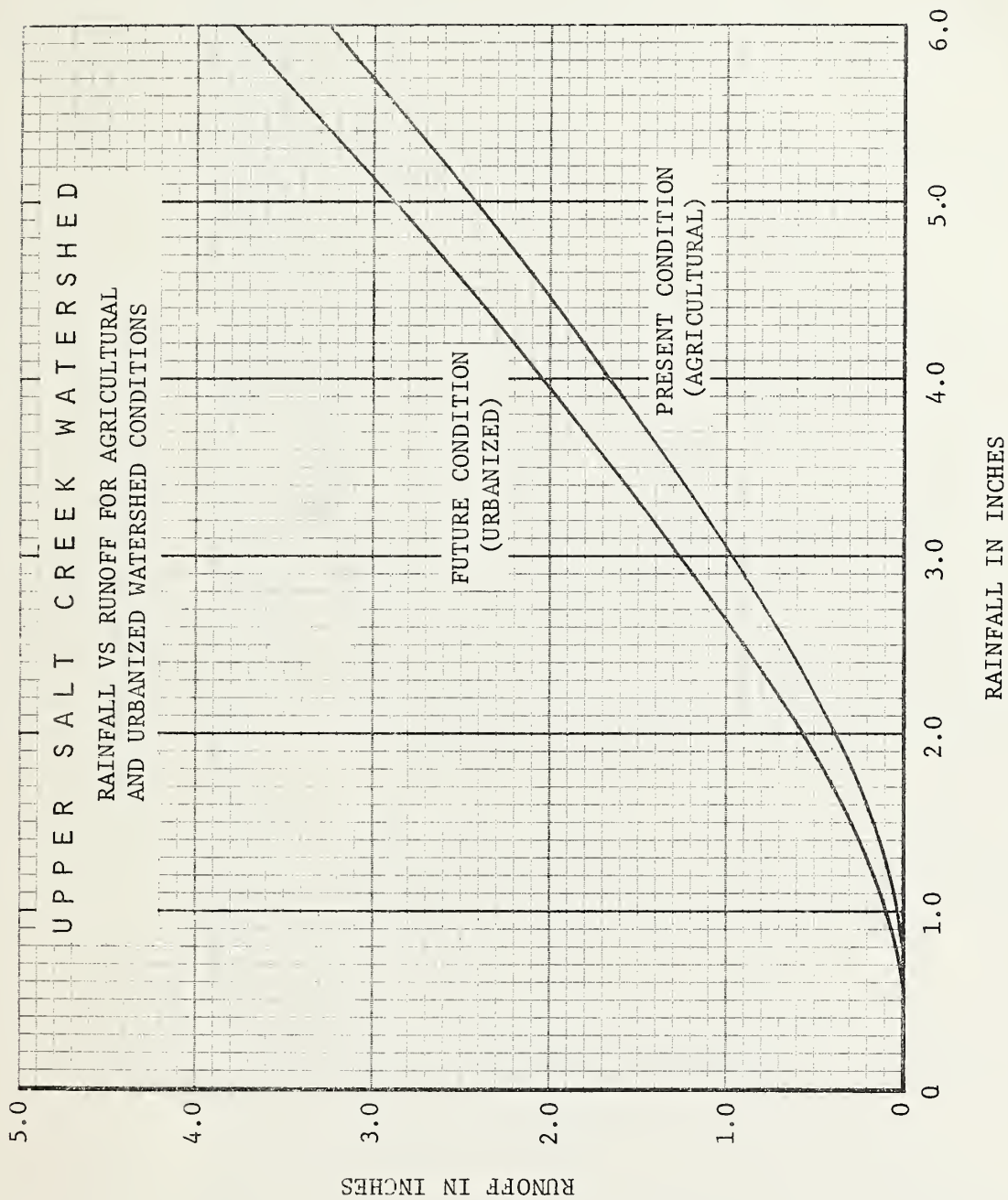
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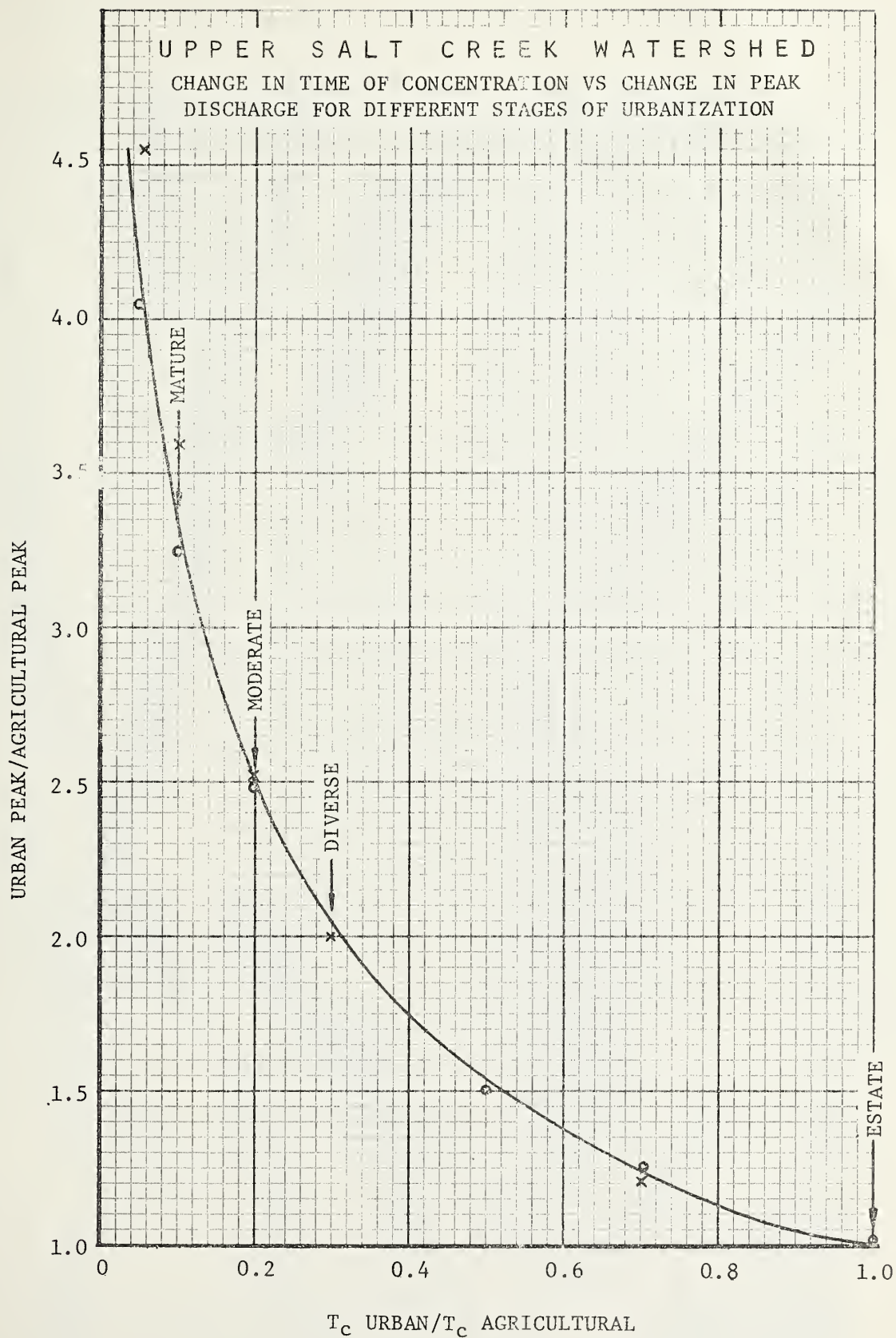
PLATE 1

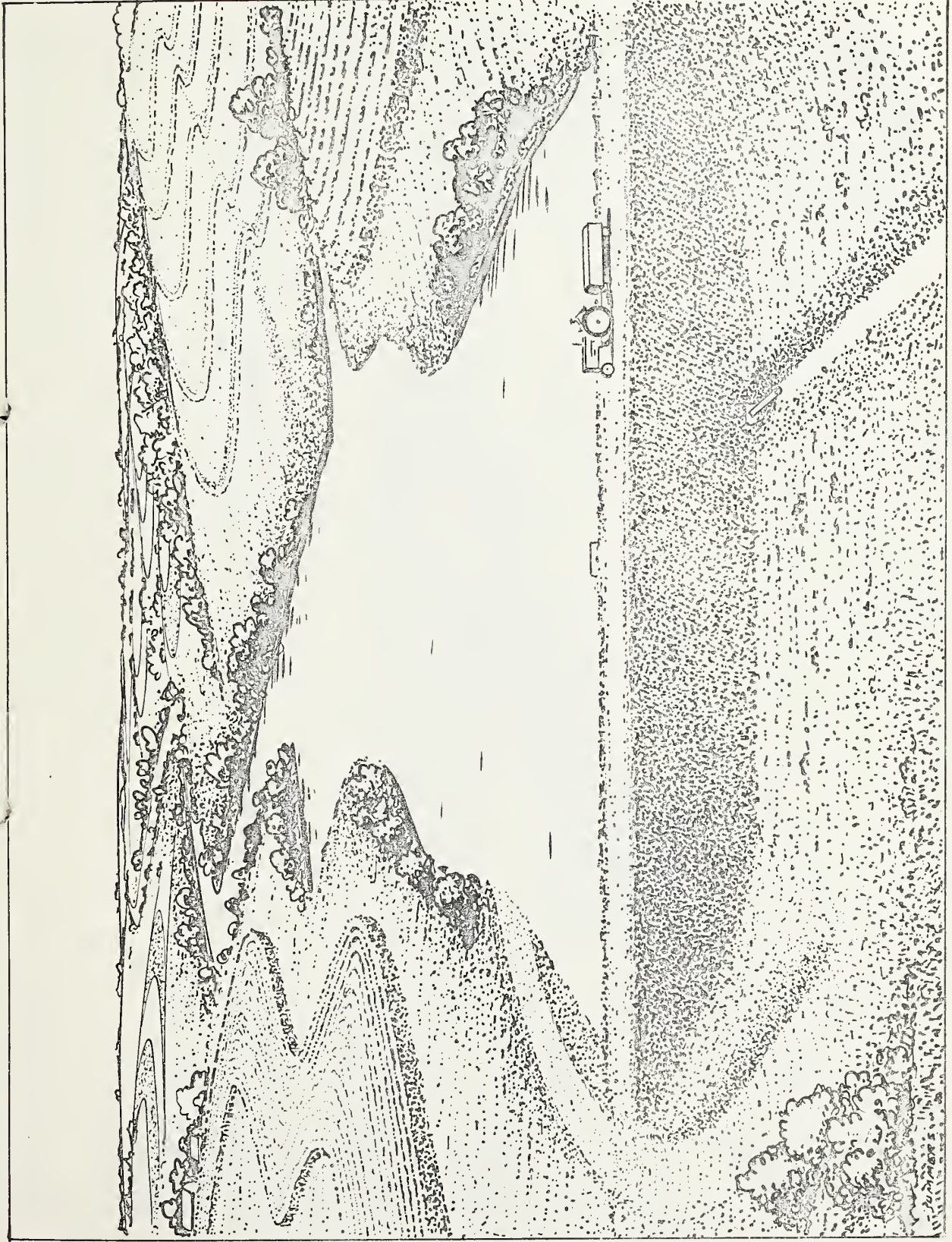
5, L-29, 264.1

UPPER SALT CREEK WATERSHED, 1971

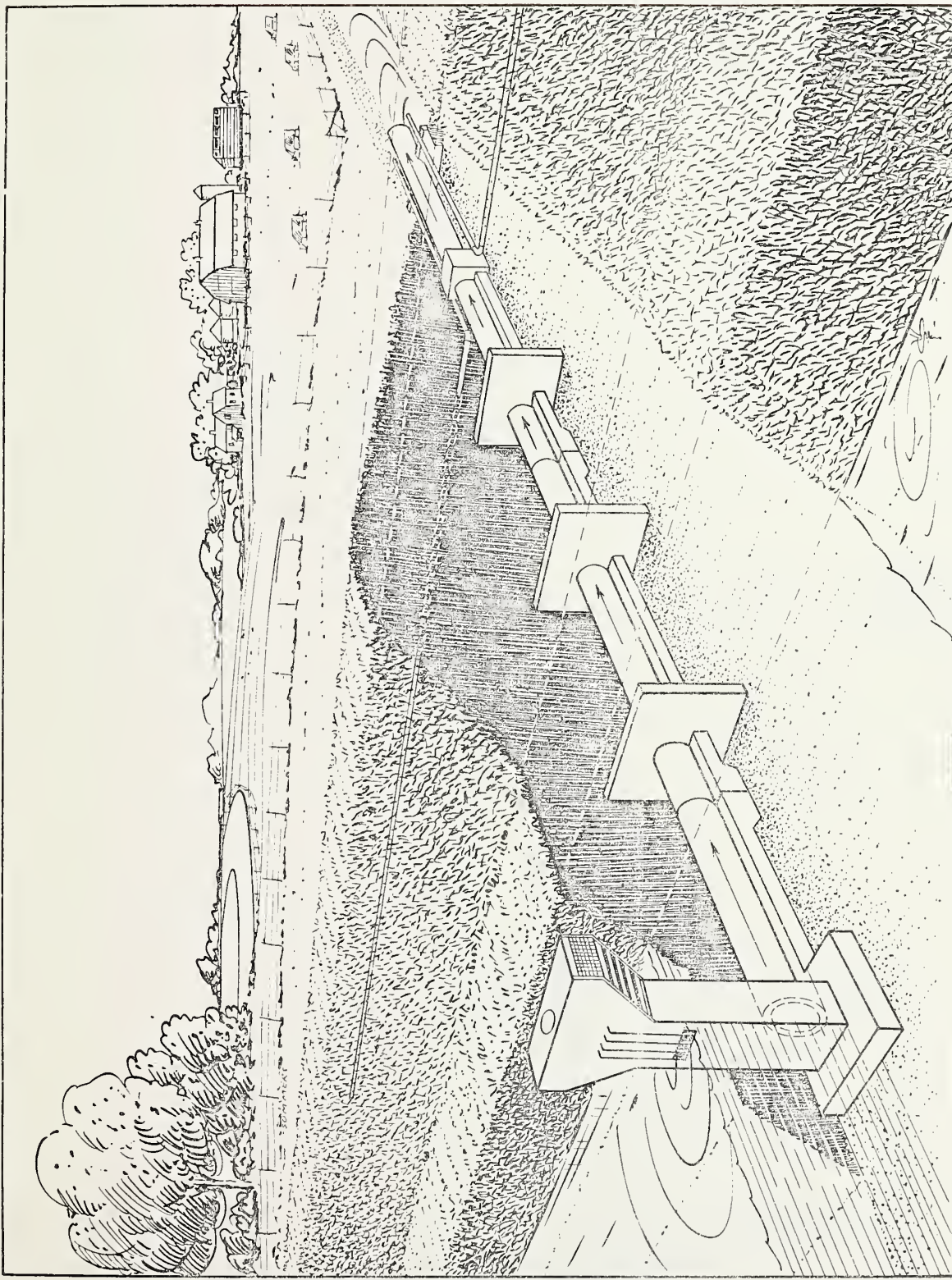






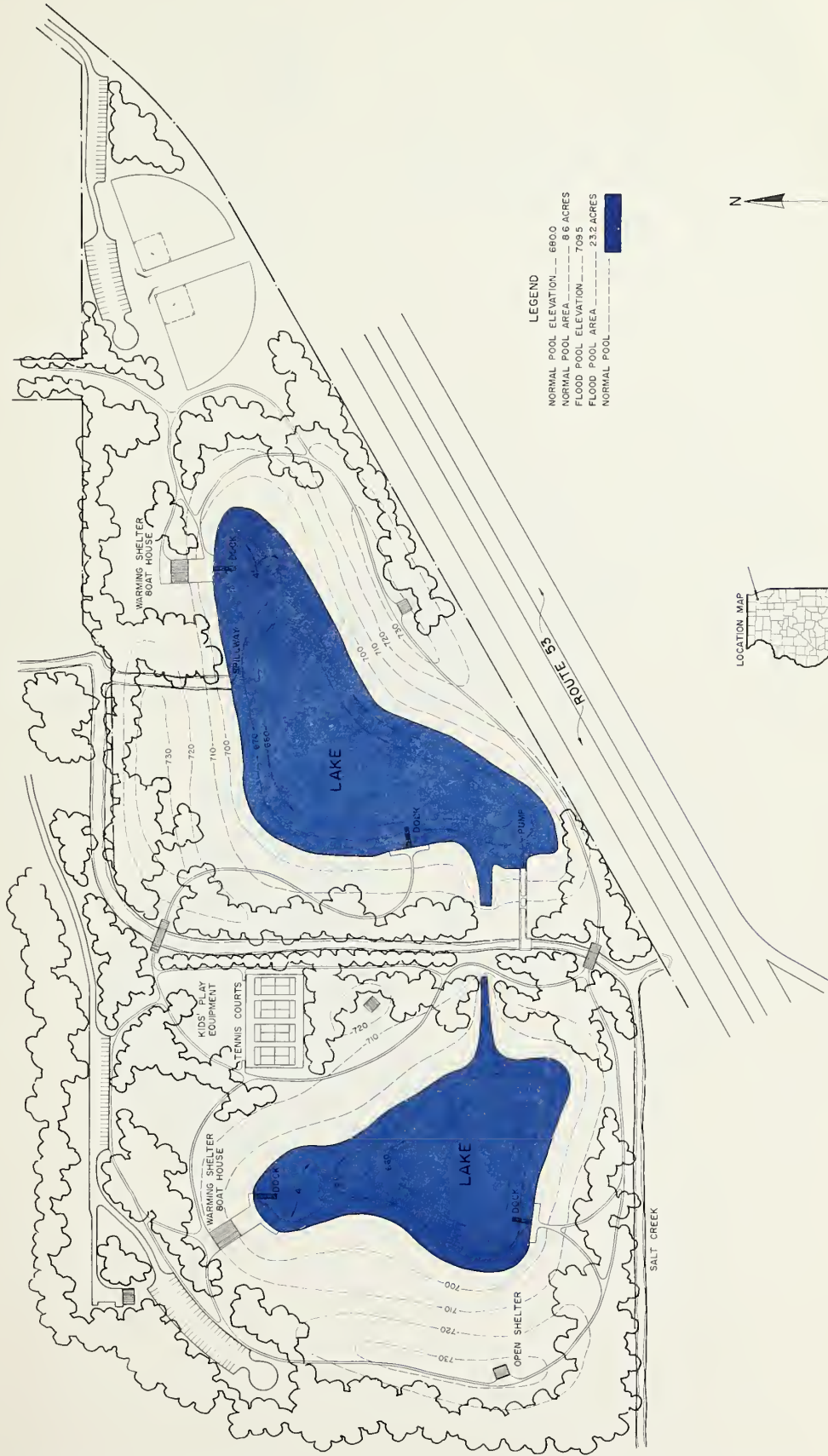


Floodwater retarding and storage reservoir



Reinforced concrete pipe with flat top inlet.





LEGEND
NORMAL POOL ELEVATION 6800
NORMAL POOL AREA 8.6 ACRES
FLOOD POOL ELEVATION 7095
FLOOD POOL AREA 232 ACRES
NORMAL POOL



LAYOUT SKETCH
UPPER SALT CREEK WATERSHED
STRUCTURE NO. 4





LEGEND

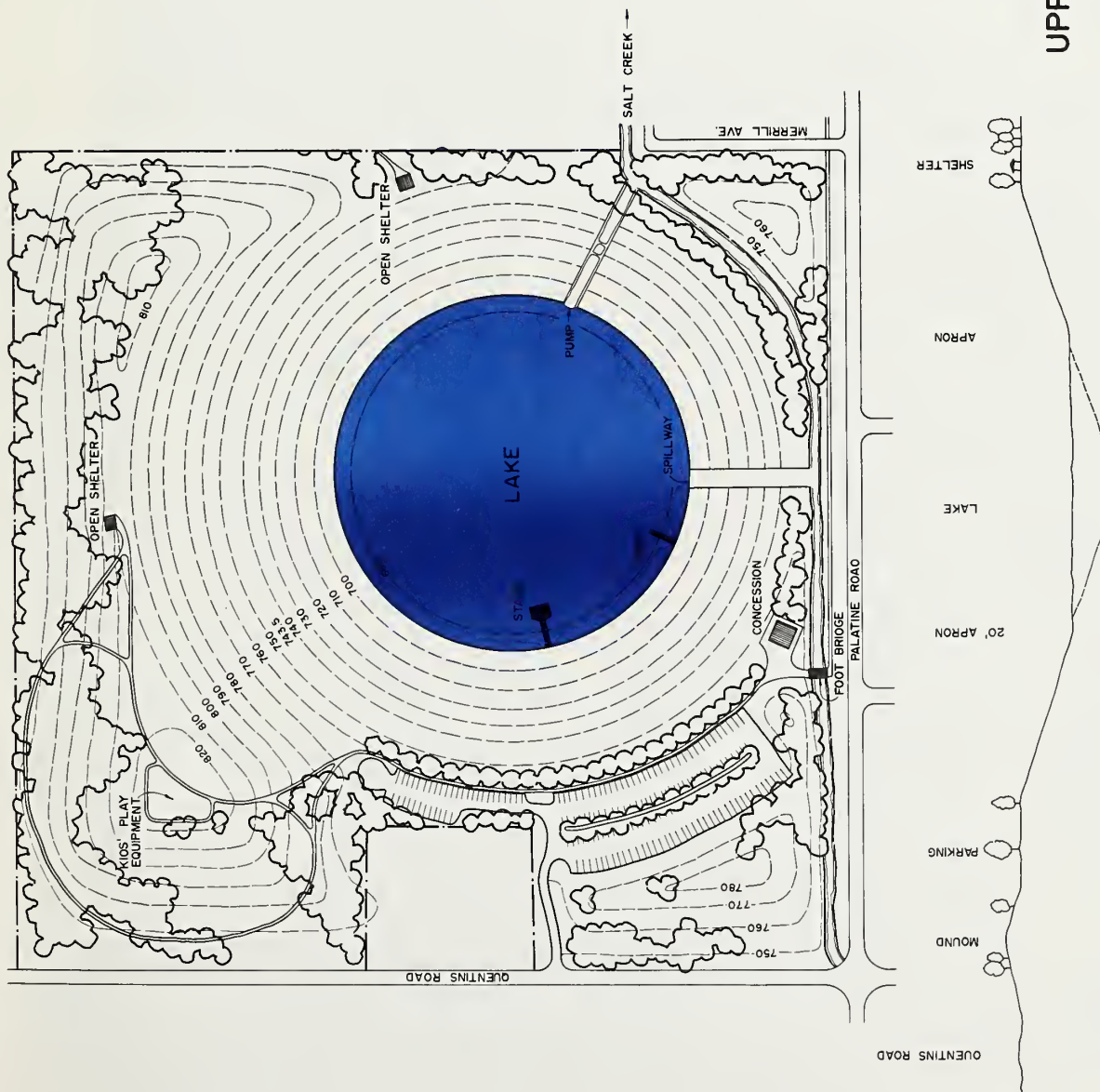
NORMAL POOL ELEVATION --- 705.0
 NORMAL POOL AREA --- 9.0 ACRES
 FLOOD POOL ELEVATION --- 742.4
 FLOOD POOL AREA --- 17.6 ACRES
 NORMAL POOL ---



LAYOUT SKETCH

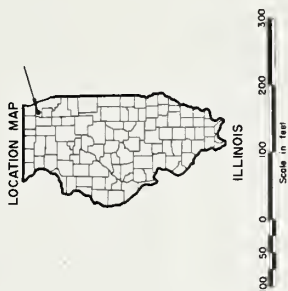
UPPER SALT CREEK WATERSHED

STRUCTURE NO. 5



LEGEND

NORMAL POOL ELEVATION	691.5
NORMAL POOL AREA	54 ACRES
FLOOD POOL ELEVATION	743.5
FLOOD POOL AREA	14.7 ACRES
NORMAL POOL	



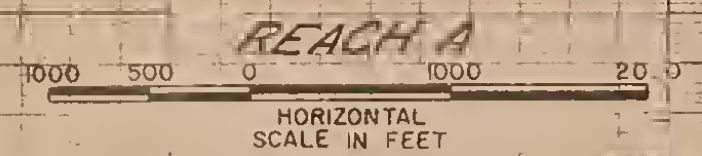
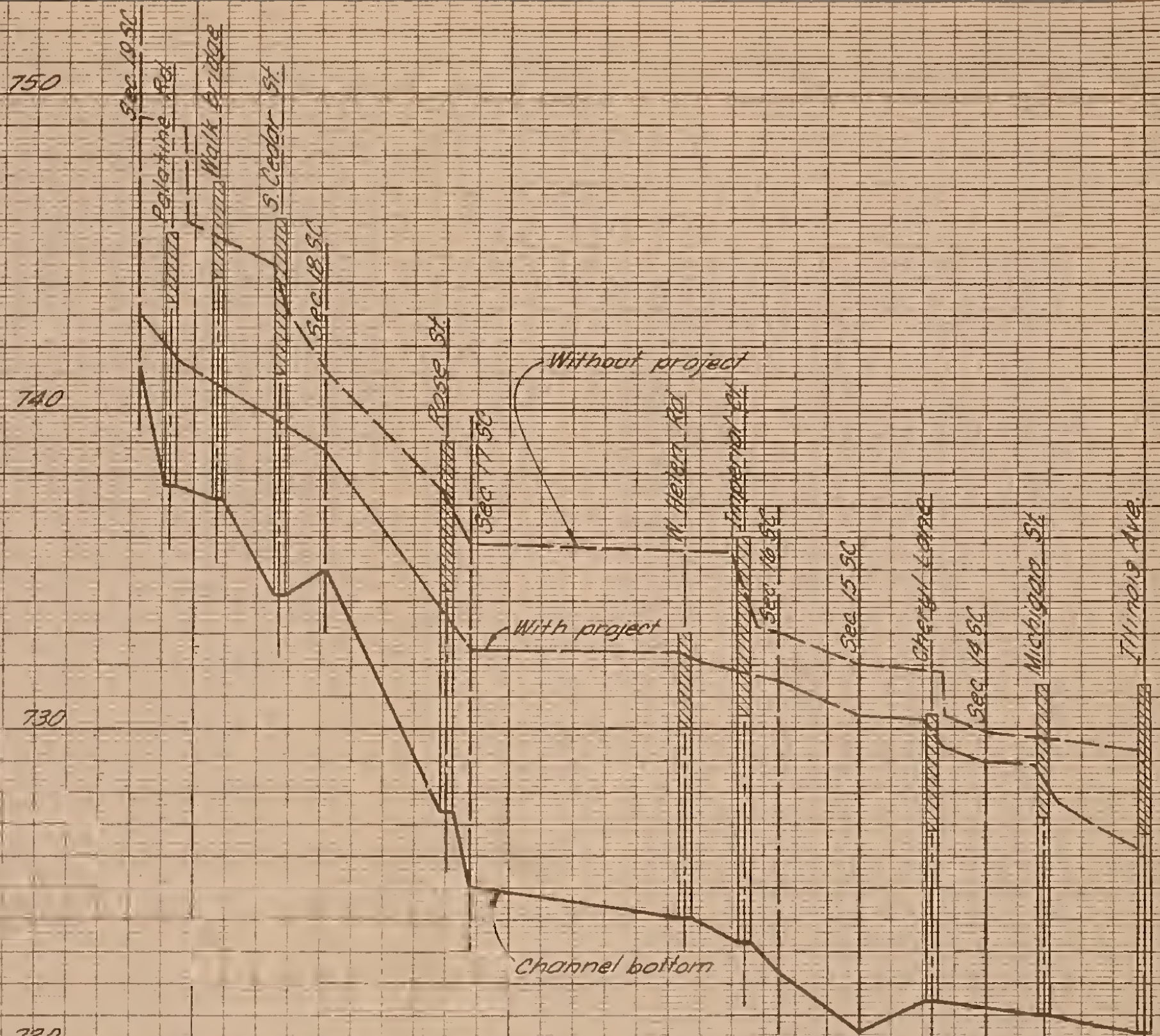
LAYOUT SKETCH UPPER SALT CREEK WATERSHED STRUCTURE NO. 6

FLOOD PLAIN UPPER SALT CREEK WATERSHED COOK, DUPAGE AND LAKE COUNTIES ILLINOIS



SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADRANGLES. PHOTOGRAPHY - JUNE 1967.
USDA-SC-LINCOLN, NEBR. 1971

5,0-29,356.1A



FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
CHANNEL - FLOODWAY OR ITS EQUIVALENT.

FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH "A"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED L. C. A.	CHECKED R. W. M.	DATE 7-70	DRAWING NO. 5, 0-29, 356, 1B

FLOOD PLAIN
UPPER SALT CREEK WATERSHED
 COOK, DUPAGE AND LAKE COUNTIES
 ILLINOIS

LEGEND

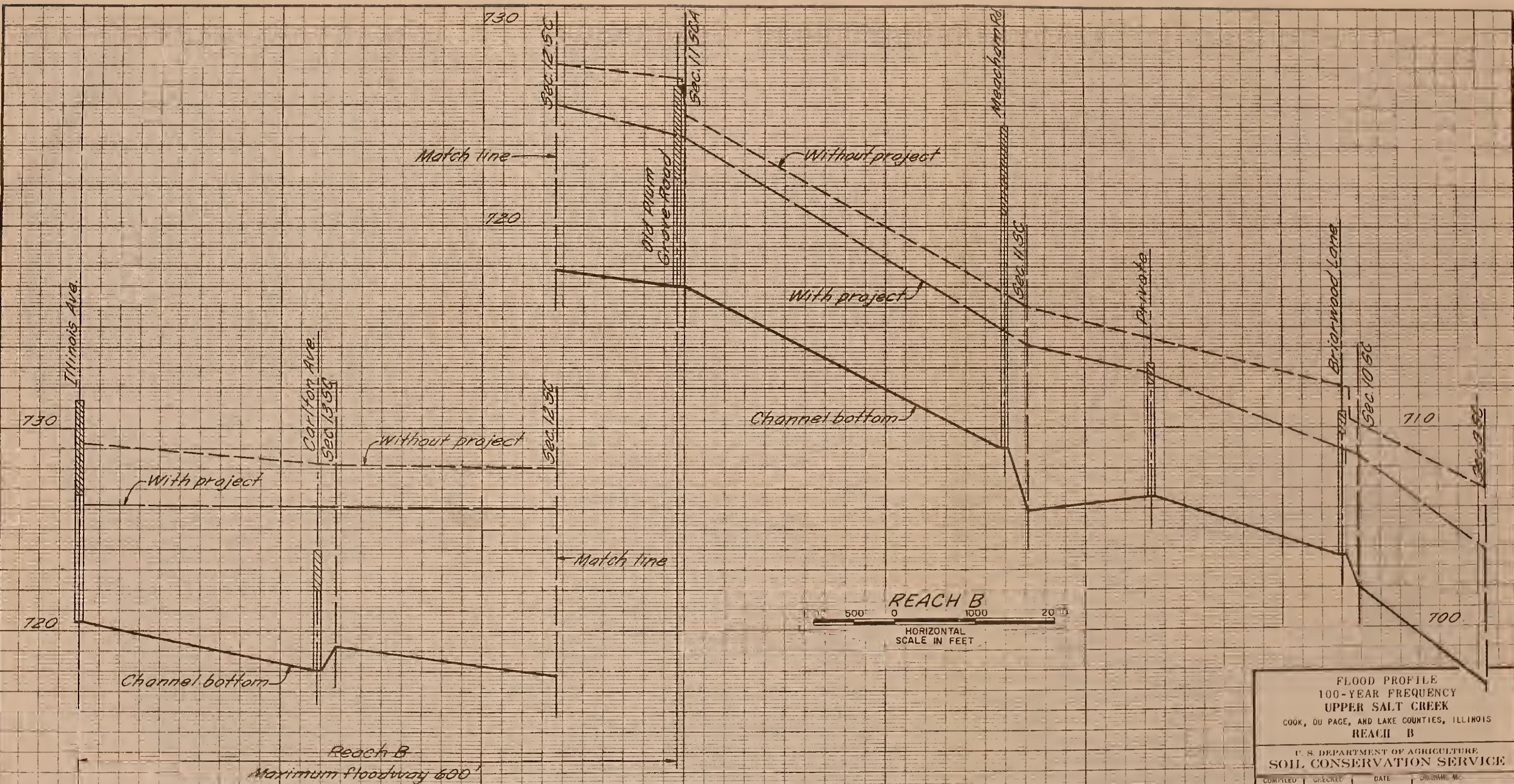
- 100 YEAR FLOOD AREA WITHOUT PROJECT
- 100 YEAR FLOOD AREA WITH PROJECT
- FLOOD PLAIN PRESERVES
- 13SC VALLEY SECTION

REACH B
 MAXIMUM FLOODWAY 600'

SCALE 1000 0 1000 2000 3000 FEET
 APPROXIMATE

SOURCE:
 UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
 USGS QUADRANGLES PHOTOGRAPHY - JUNE 1967

5,0-29,356.2A



FLOOD PROFILE IS BASED ON MAINTENANCE OF 100% CHANNEL - FLOODWAY OR ITS EQUIVALENT.

FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH B			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWN BY
L. C. A.	R. W. M.	7-70	5,0-29,356.2B

FLOOD PLAIN
UPPER SALT CREEK WATERSHED
COOK, DUPAGE AND LAKE COUNTIES
ILLINOIS

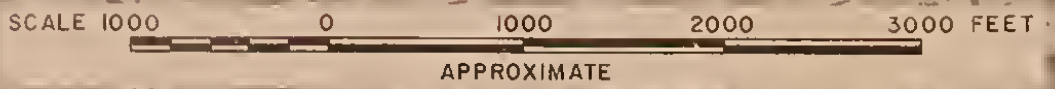


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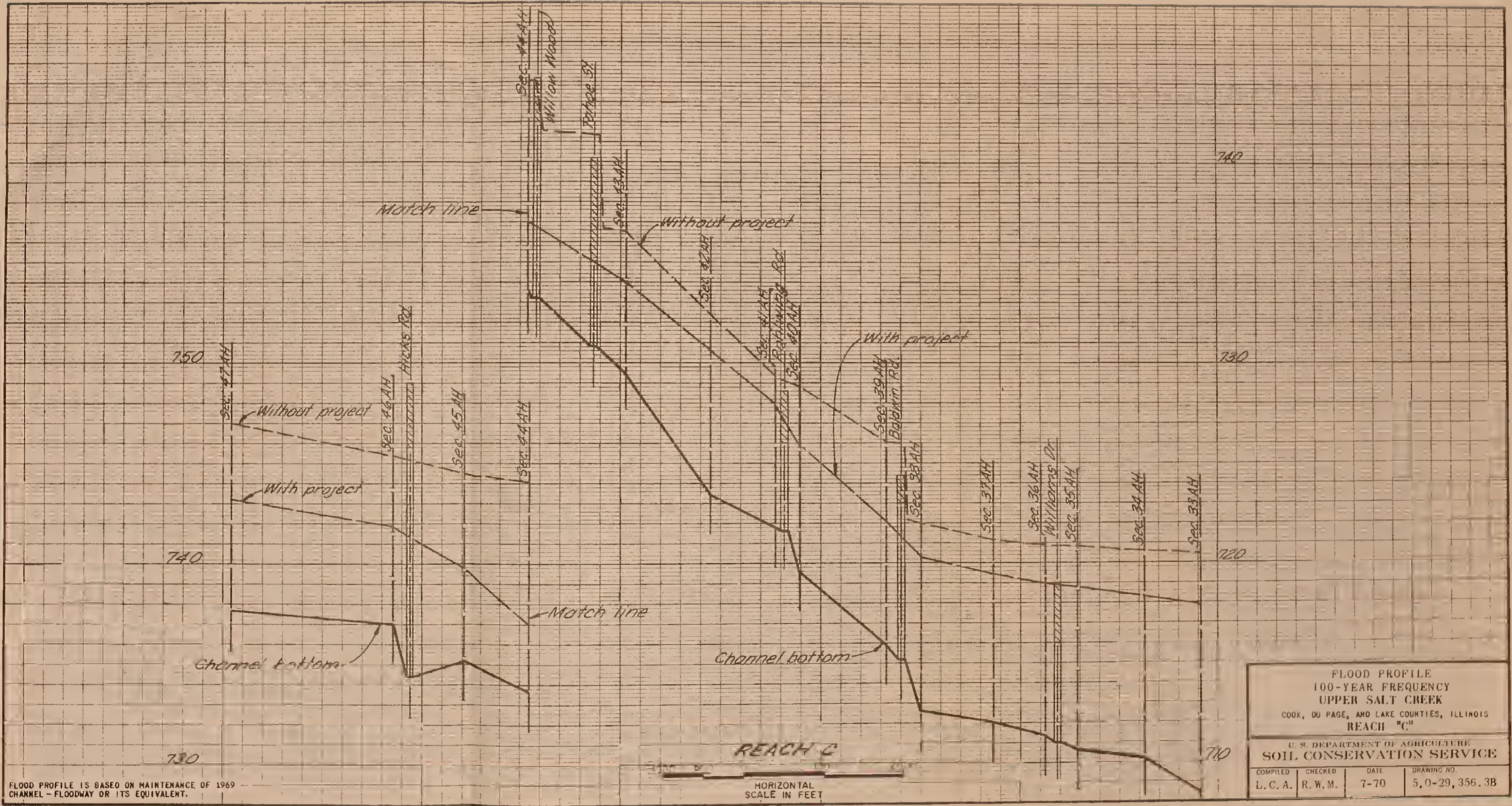
 100 YEAR FLOOD AREA WITHOUT PROJECT

 100 YEAR FLOOD AREA WITH PROJECT

47AH — VALLEY SECTION



SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADRANGLES. PHOTOGRAPHY - JUNE 1967.
USDA-SCS/LINCOLN, NEBR., 1971



FLOOD PLAIN UPPER SALT CREEK WATERSHED COOK, DUPAGE AND LAKE COUNTIES ILLINOIS

R
I
E
R
I
O
E18 19
13 2419 30
24 25

KENILWORTH

30AH

31AH

32AH

33AH

FLOODWATER
RETARDING
STRUCTURE NO. 4
(PIT TYPE)

PALATINE RD.

13 24
14 23

NORTHWEST HWY.

C. & N.W.R.R.

ROUTE 53

52AH

54AH

29AH

28AH

27AH

26AH

KIRCHOFF RD.

25AH

EUCLID AVE.

25 36
26 35

LEGEND

100 YEAR FLOOD AREA
WITHOUT PROJECT100 YEAR FLOOD AREA
WITH PROJECT

31AH

VALLEY SECTION

SCALE 1000

0

1000

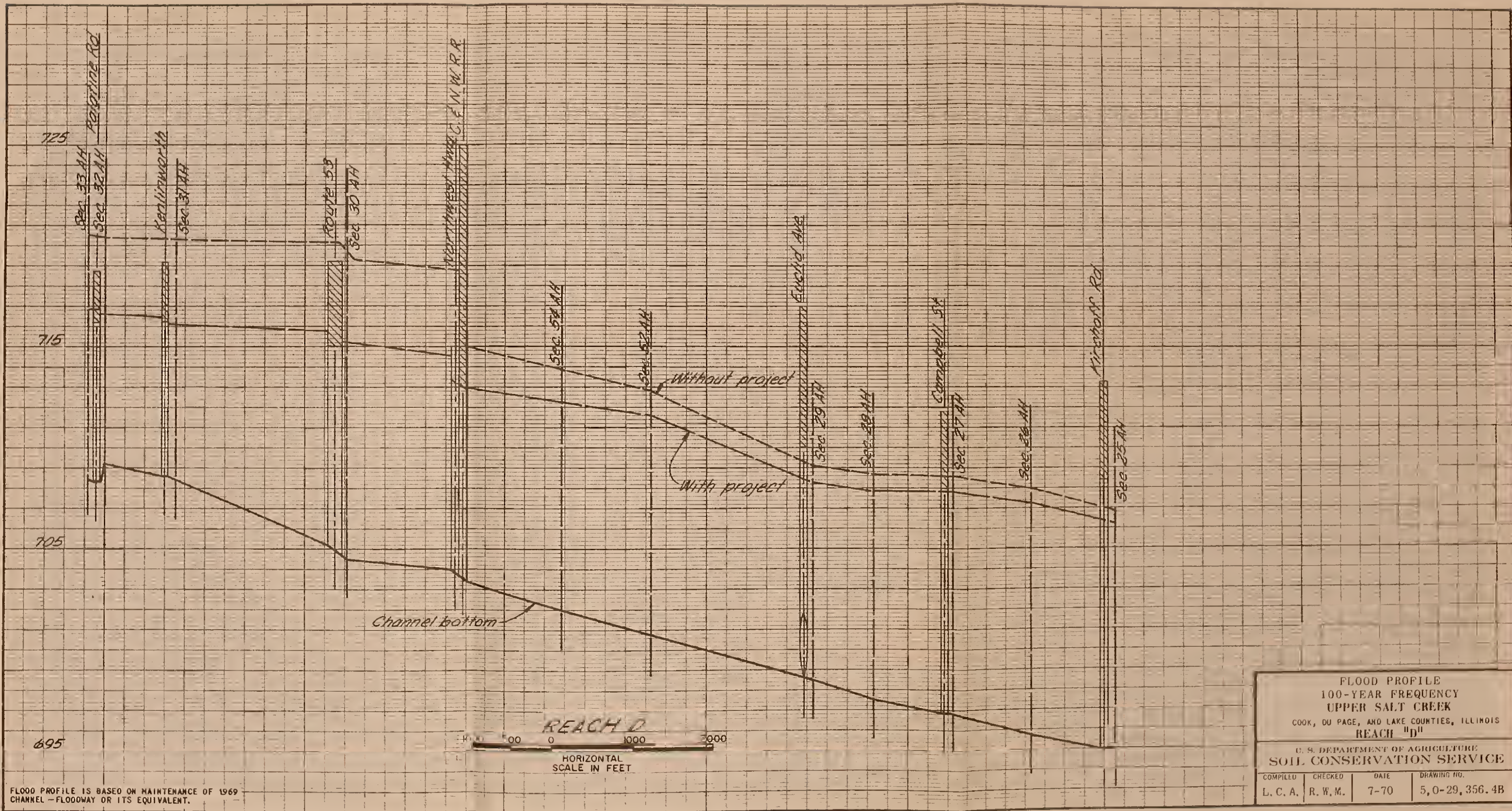
2000

3000 FEET

APPROXIMATE

SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADRANGLES. PHOTOGRAPHY - JUNE 1967.
USDA-SCS-LINCOLN, NEBR. 1971

5,0-29,356.4A



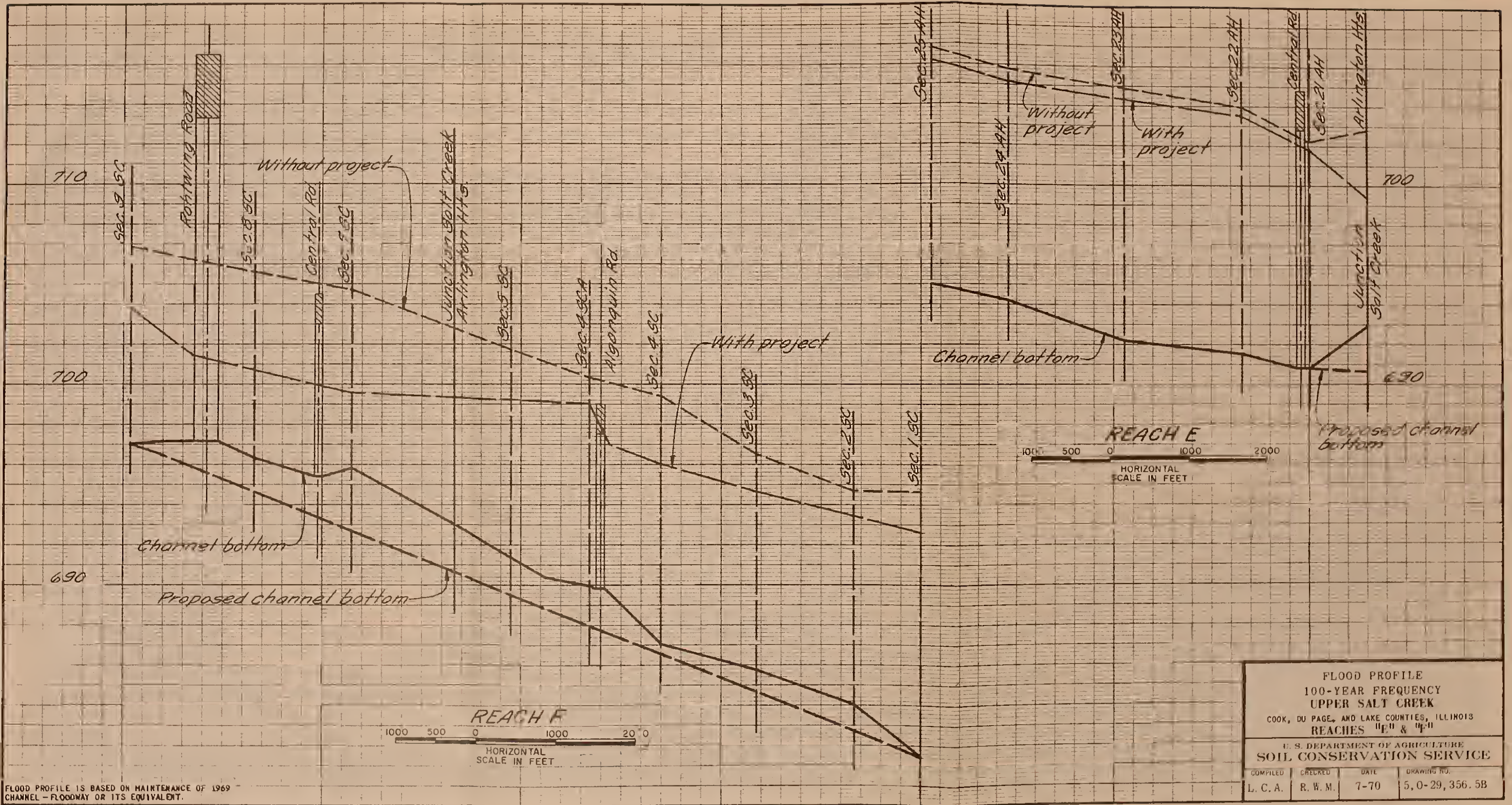
FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
CHANNEL - FLOODWAY OR ITS EQUIVALENT.

FLOOD PROFILE
100-YEAR FREQUENCY
UPPER SALT CREEK
COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS
REACH "D"

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

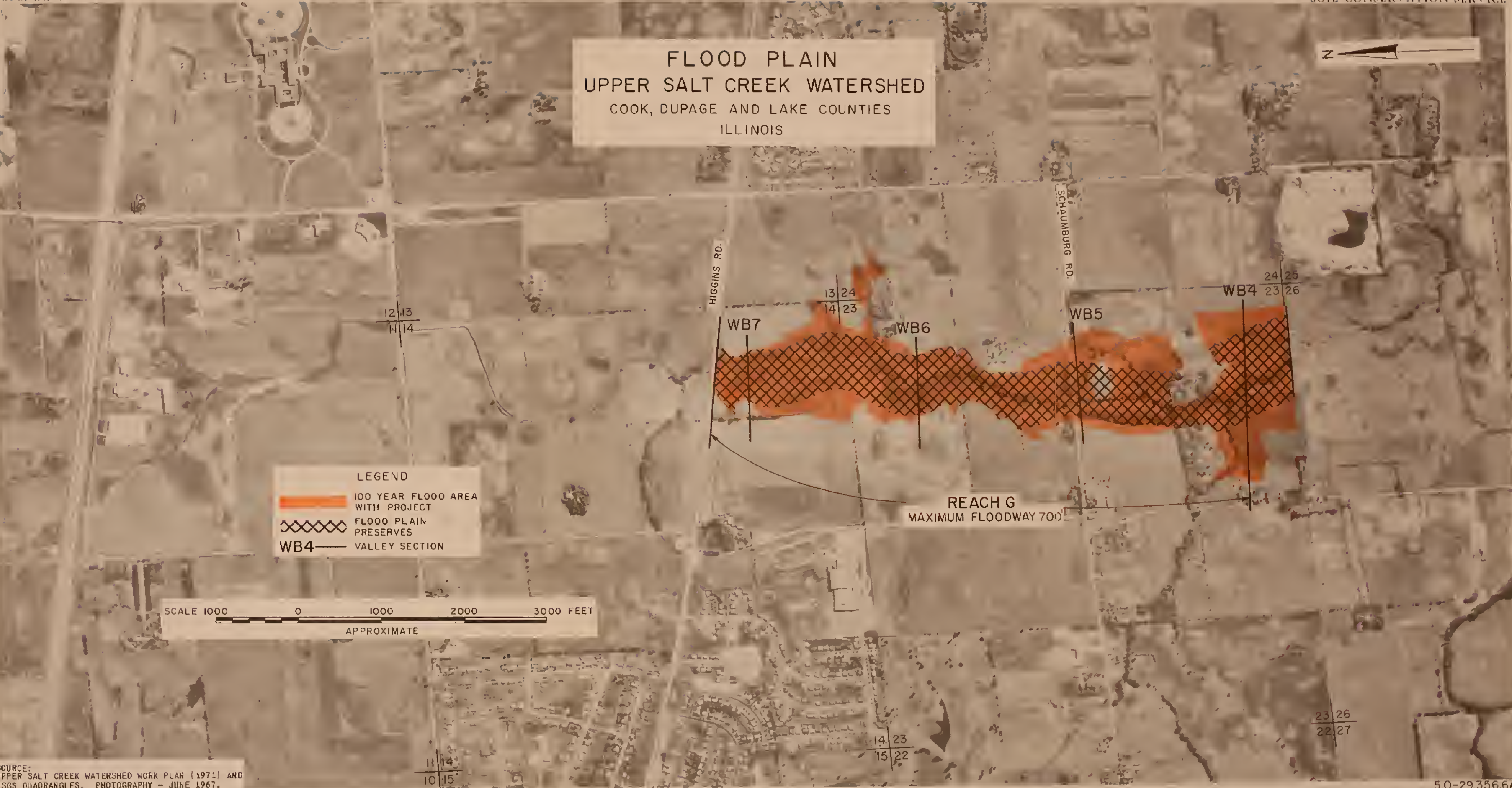
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L. C. A.	R. W. M.	7-70	5, 0-29, 356. 4B





FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
CHANNEL - FLOODWAY OR ITS EQUIVALENT.

FLOOD PLAIN
UPPER SALT CREEK WATERSHED
COOK, DUPAGE AND LAKE COUNTIES
ILLINOIS

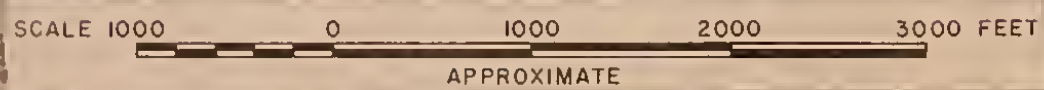


LEGEND

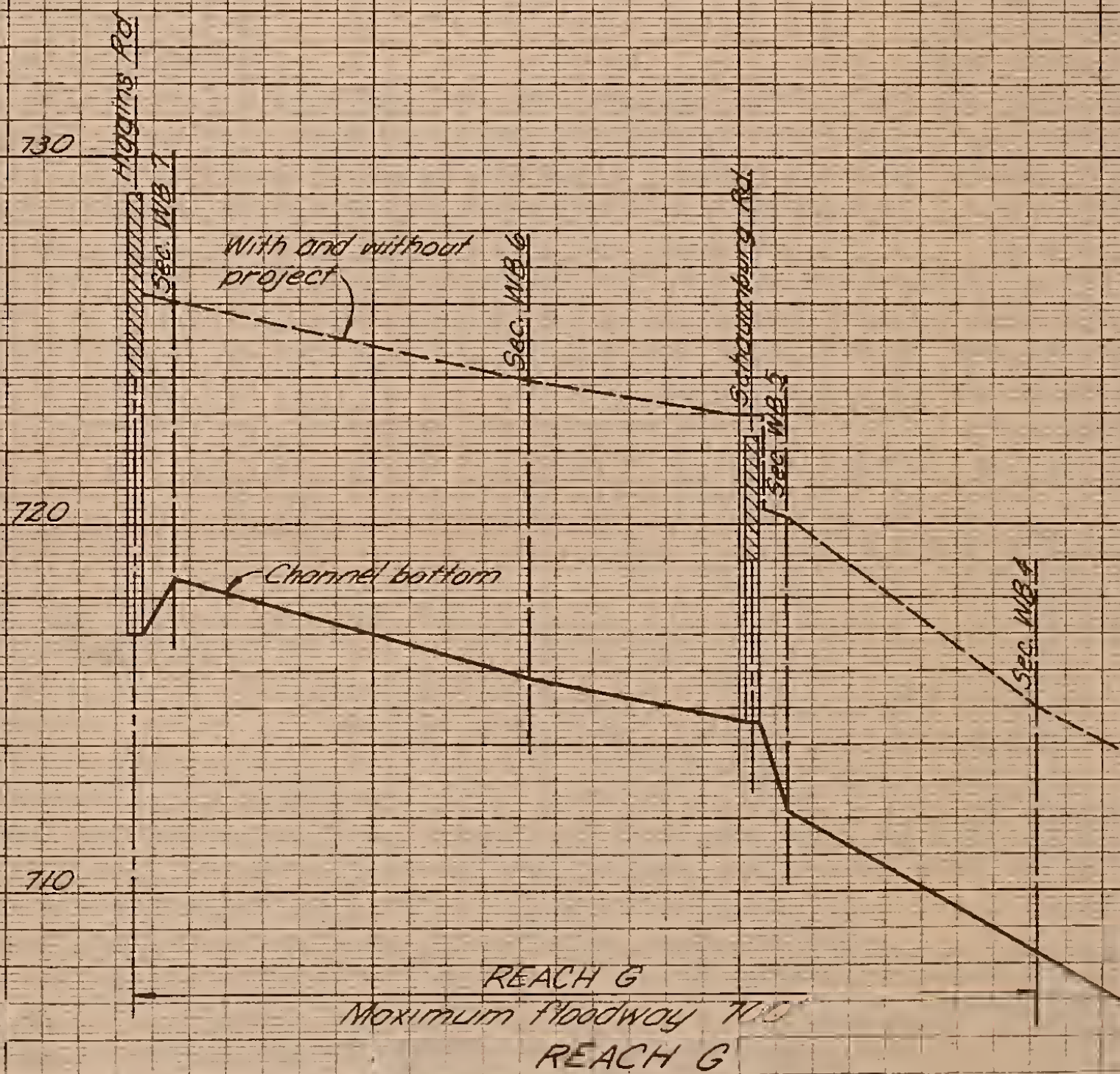
 100 YEAR FLOOD AREA WITH PROJECT

 FLOOD PLAIN PRESERVES

 WB4 VALLEY SECTION



SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADRANGLES. PHOTOGRAPHY - JUNE 1967.
USDA SCS LINCOLN, NEBR. 1971



1000 500 0 1000 2000
HORIZONTAL
SCALE IN FEET

FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
CHANNEL - FLOODWAY OR ITS EQUIVALENT.

FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH "G"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED L. C. A.	CHECKED R. W. M.	DATE 7-70	DRAWING NO. 5,0-29,356.6B

FLOOD PLAIN
UPPER SALT CREEK WATERSHED
COOK, DUPAGE AND LAKE COUNTIES
ILLINOIS



MEACHAM RD.

ROHLWING RD.

23 24
26 25

24 19
25 20

19 20
30 29

WBI

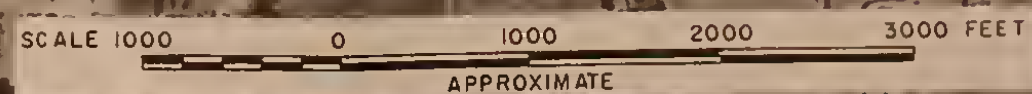
WB2

W 3

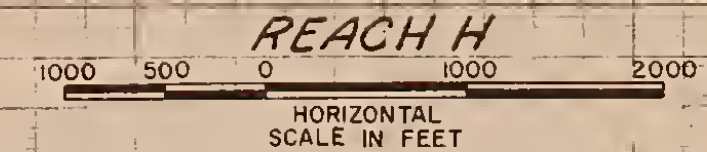
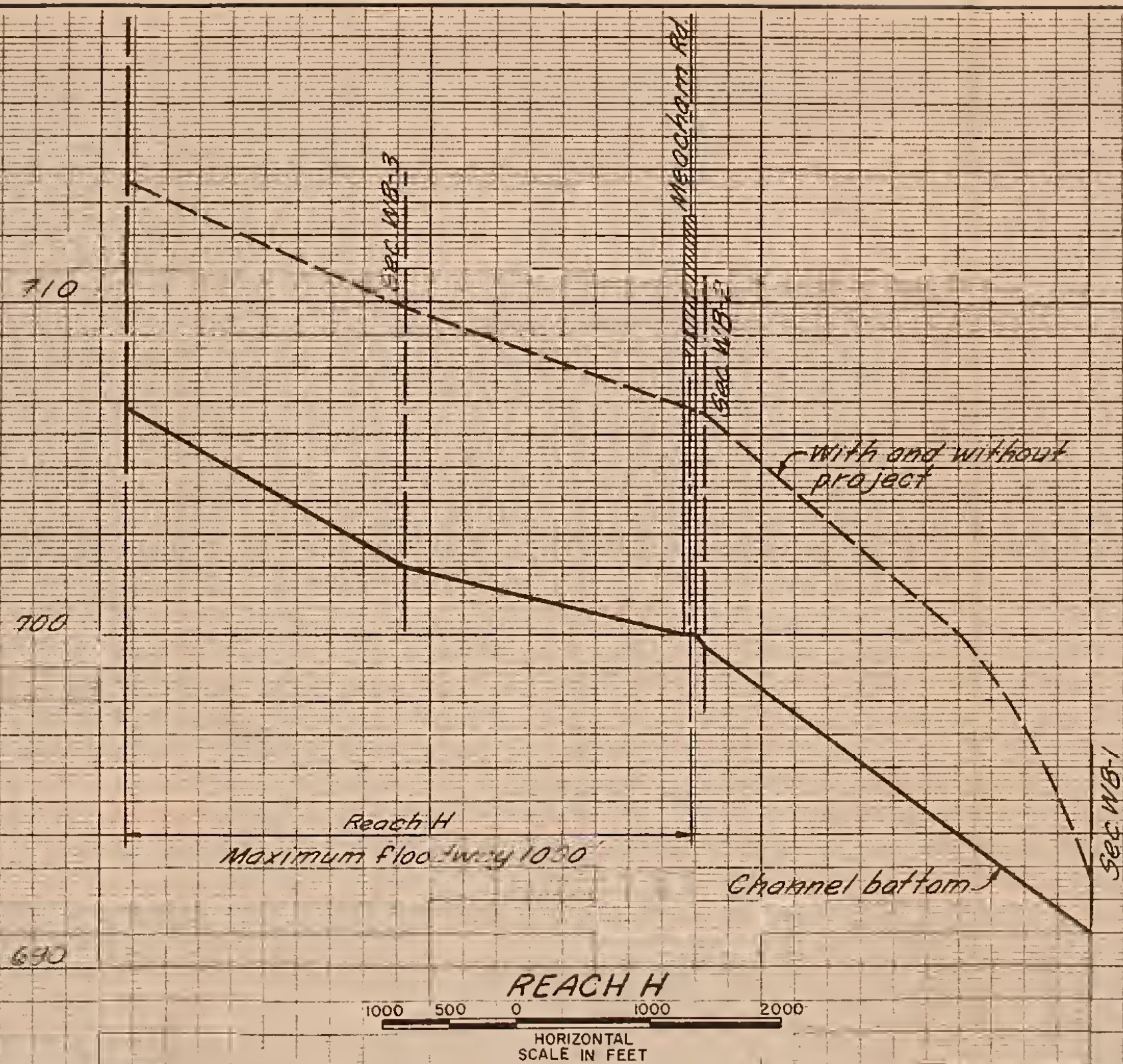
LEGEND

- 100 YEAR FLOOD AREA WITH PROJECT
- FLOOD PLAIN PRESERVES
- WBI VALLEY SECTION

REACH H
MAXIMUM FLOODWAY 1000'



SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADRANGLES, PHOTOGRAPHY - JUNE 1967.
USDA-SCS-LINCOLN, NEBR., 1971



FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH "H"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
L. C. A.	R. W. M.	7-70	5, 0-29, 356. 7B

FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
 CHANNEL - FLOODWAY OR ITS EQUIVALENT.

FLOOD PLAIN
UPPER SALT CREEK WATERSHED
COOK, DUPAGE AND LAKE COUNTIES
ILLINOIS

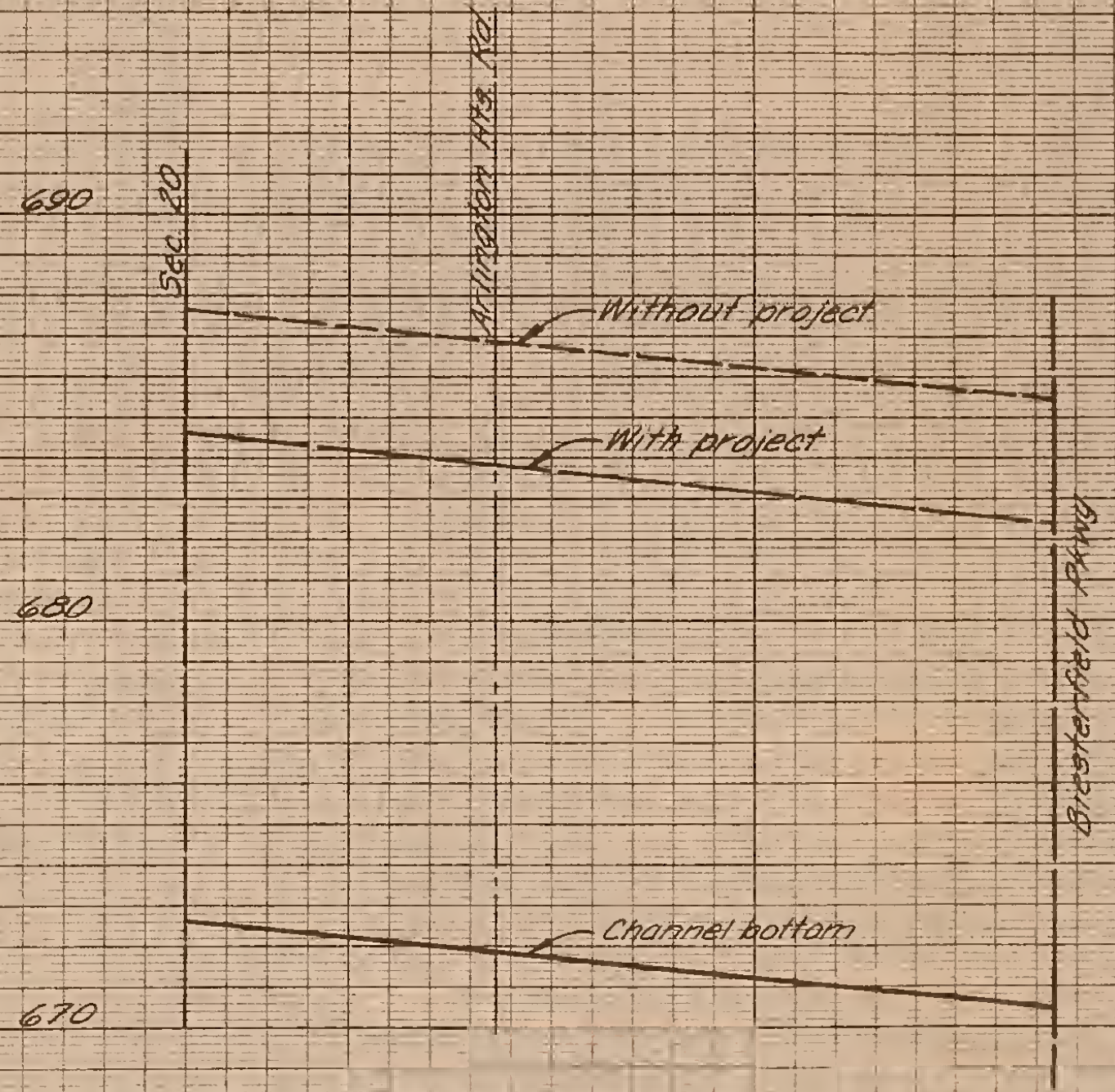


LEGEND

- 100 YEAR FLOOD AREA WITHOUT PROJECT
- 100 YEAR FLOOD AREA WITH PROJECT
- 20 VALLEY SECTION



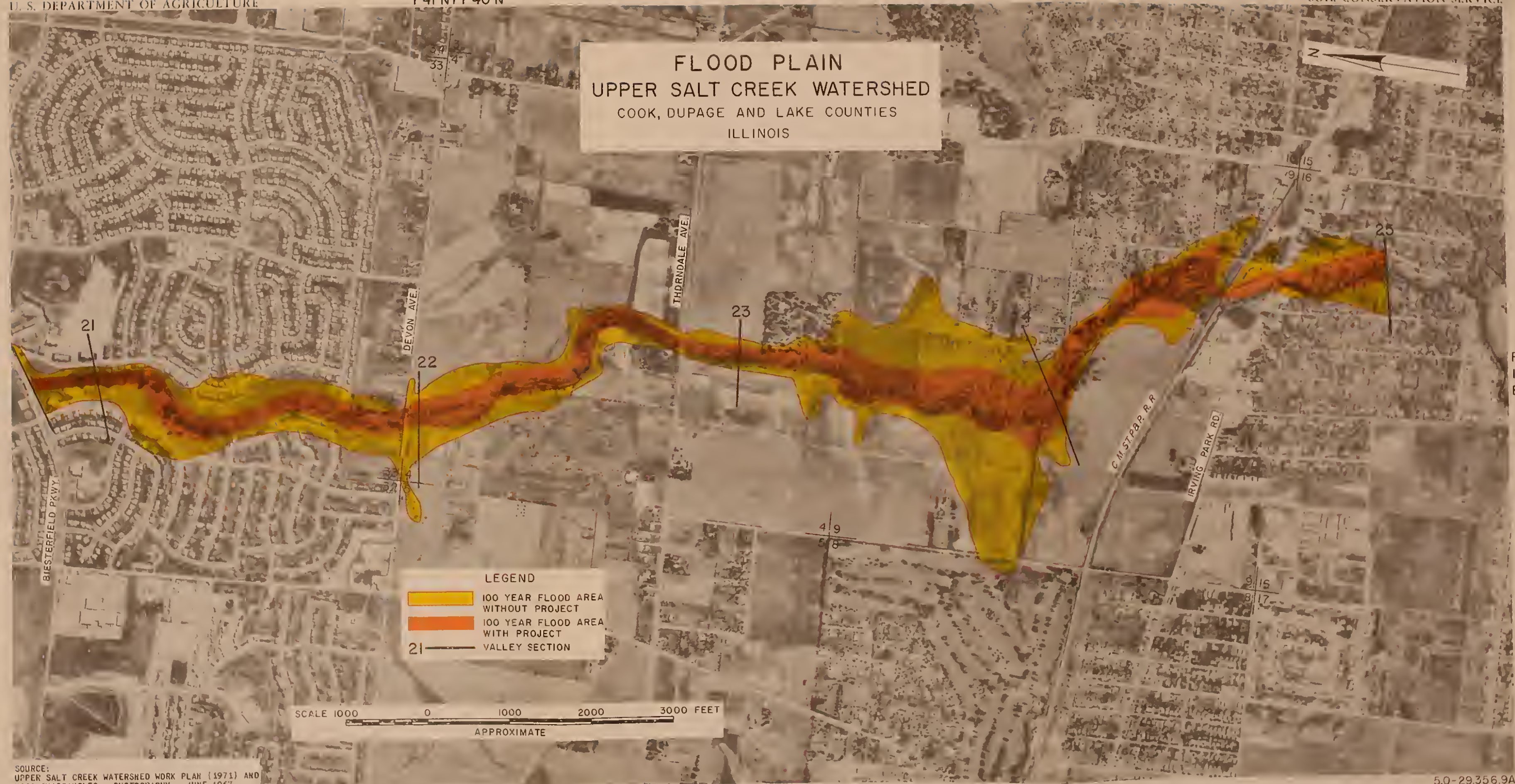
SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADRANGLES. PHOTOGRAPHY - JUNE 1967.
USDA SCS-LINCOLN, NEBR. 1971



FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969.
CHANNEL - FLOODWAY OR ITS EQUIVALENT.

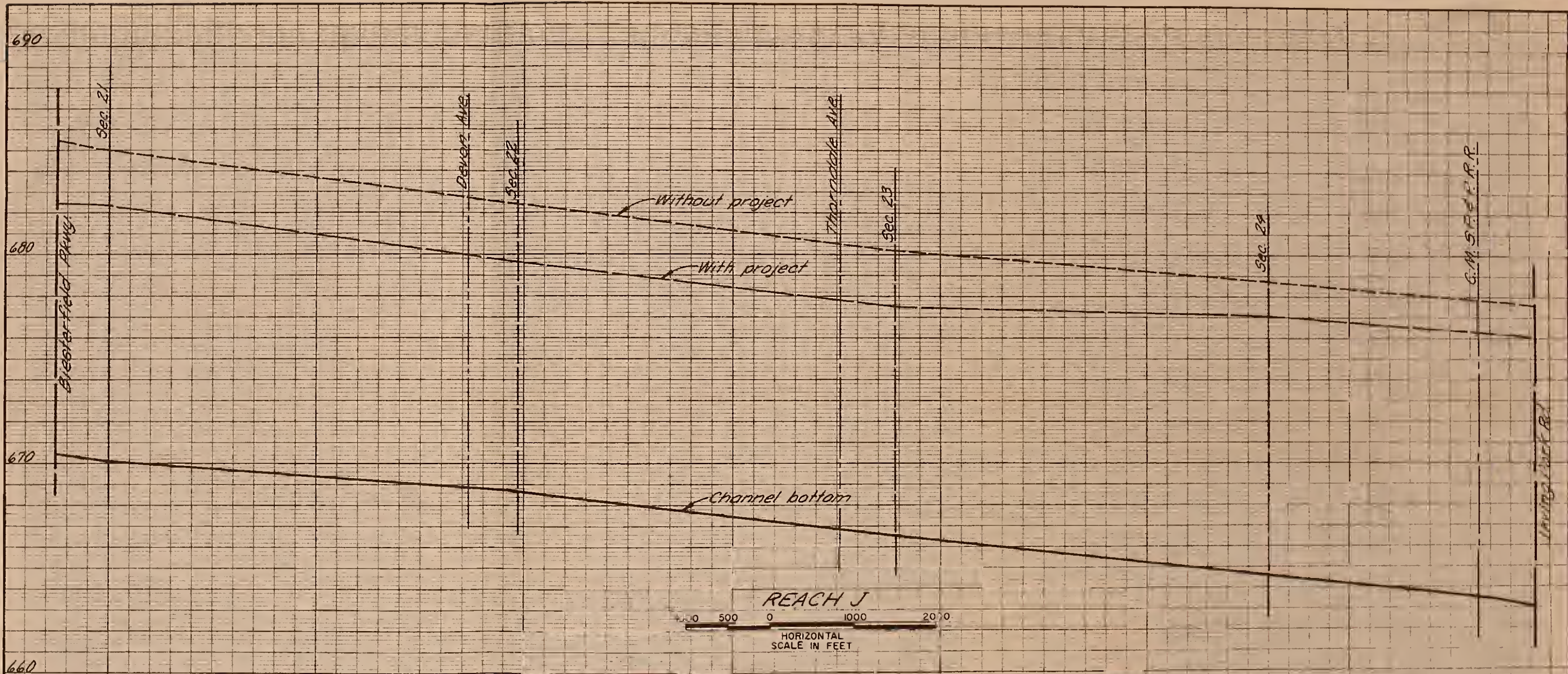
FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH "I"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
L. C. A.	R. W. M.	7-70	5,0-29,356.8B

FLOOD PLAIN
UPPER SALT CREEK WATERSHED
COOK, DUPAGE AND LAKE COUNTIES
ILLINOIS



SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADRANGLES. PHOTOGRAPHY - JUNE 1967.
USDA SCS LINCOLN, NEBR. 1971

5,0-29,356.9A

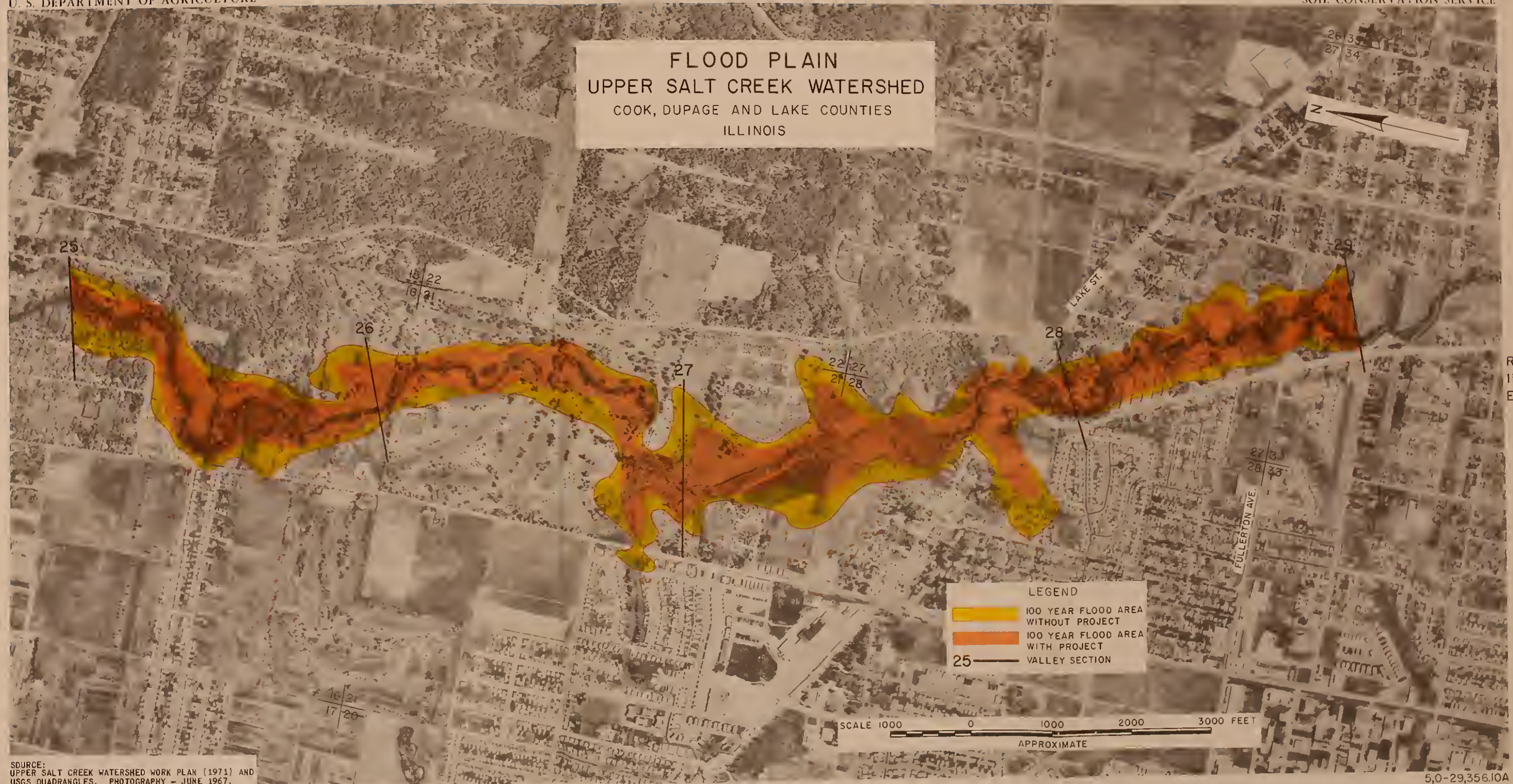


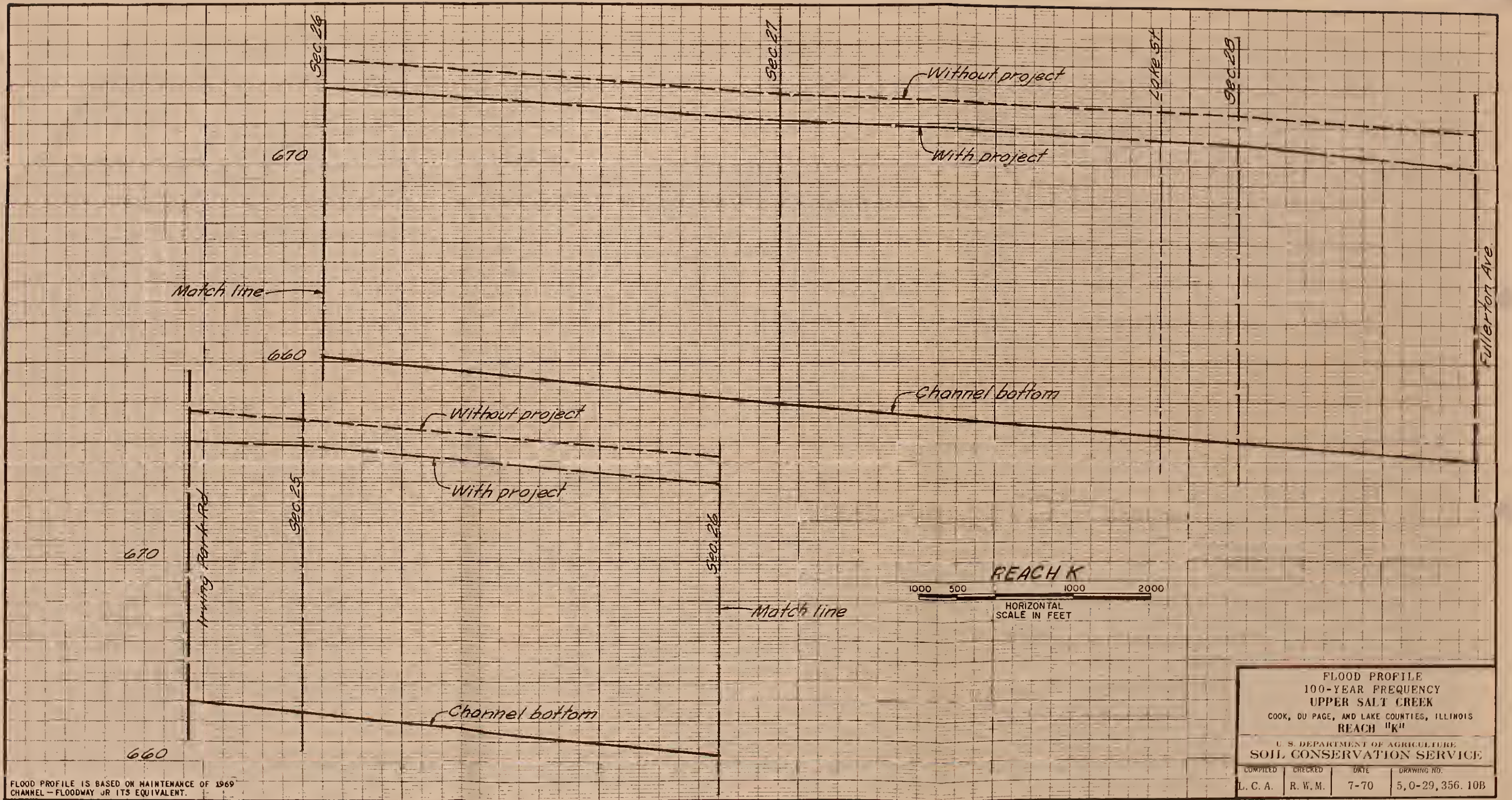
REACH J
 0 500 1000 2000
 HORIZONTAL
 SCALE IN FEET

FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
 CHANNEL - FLOODWAY OR ITS EQUIVALENT.

FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH "J"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
L. C. A.	R. W. M.	7-70	5,0-29,356.9B

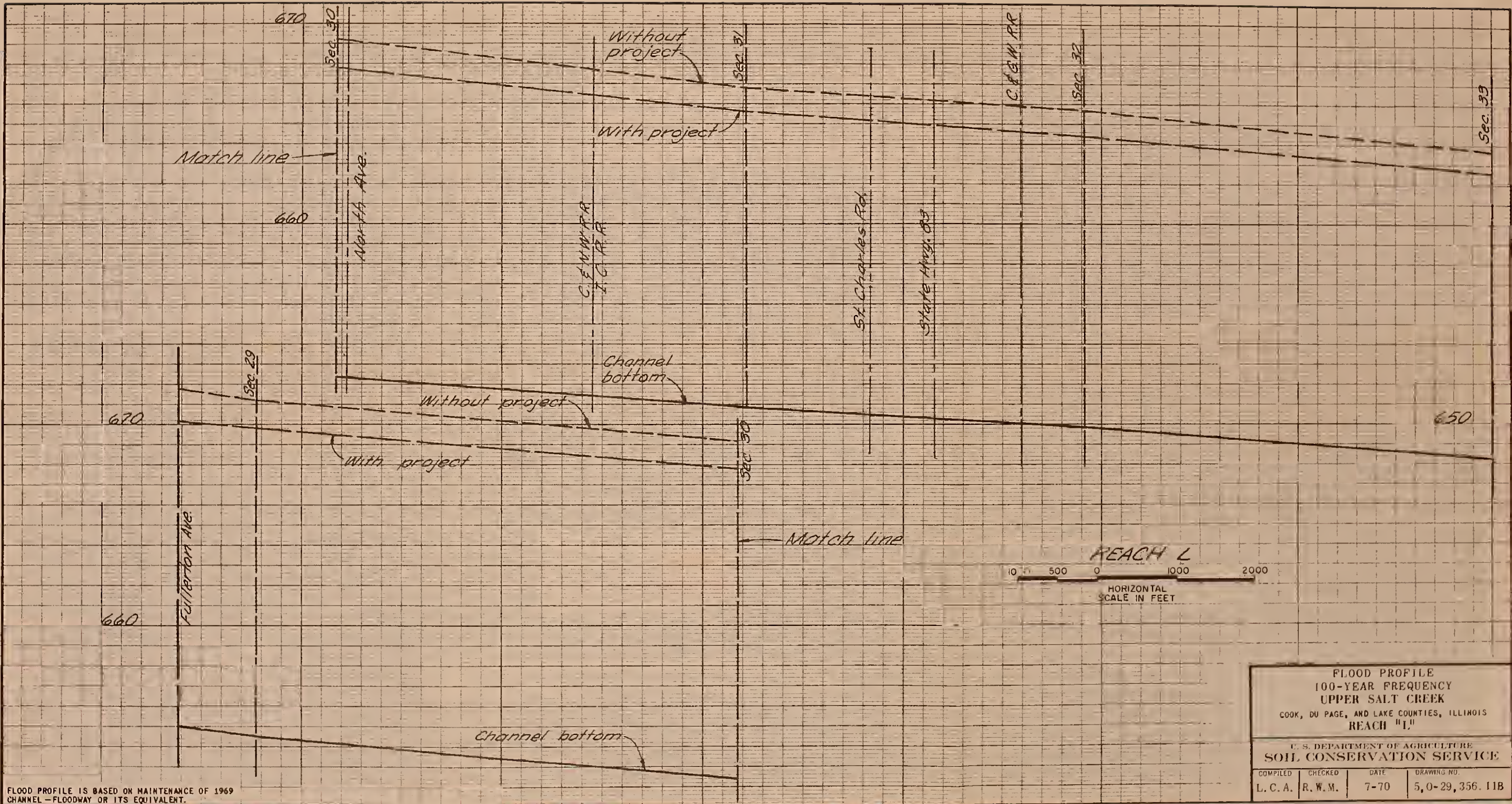
FLOOD PLAIN
UPPER SALT CREEK WATERSHED
COOK, DUPAGE AND LAKE COUNTIES
ILLINOIS





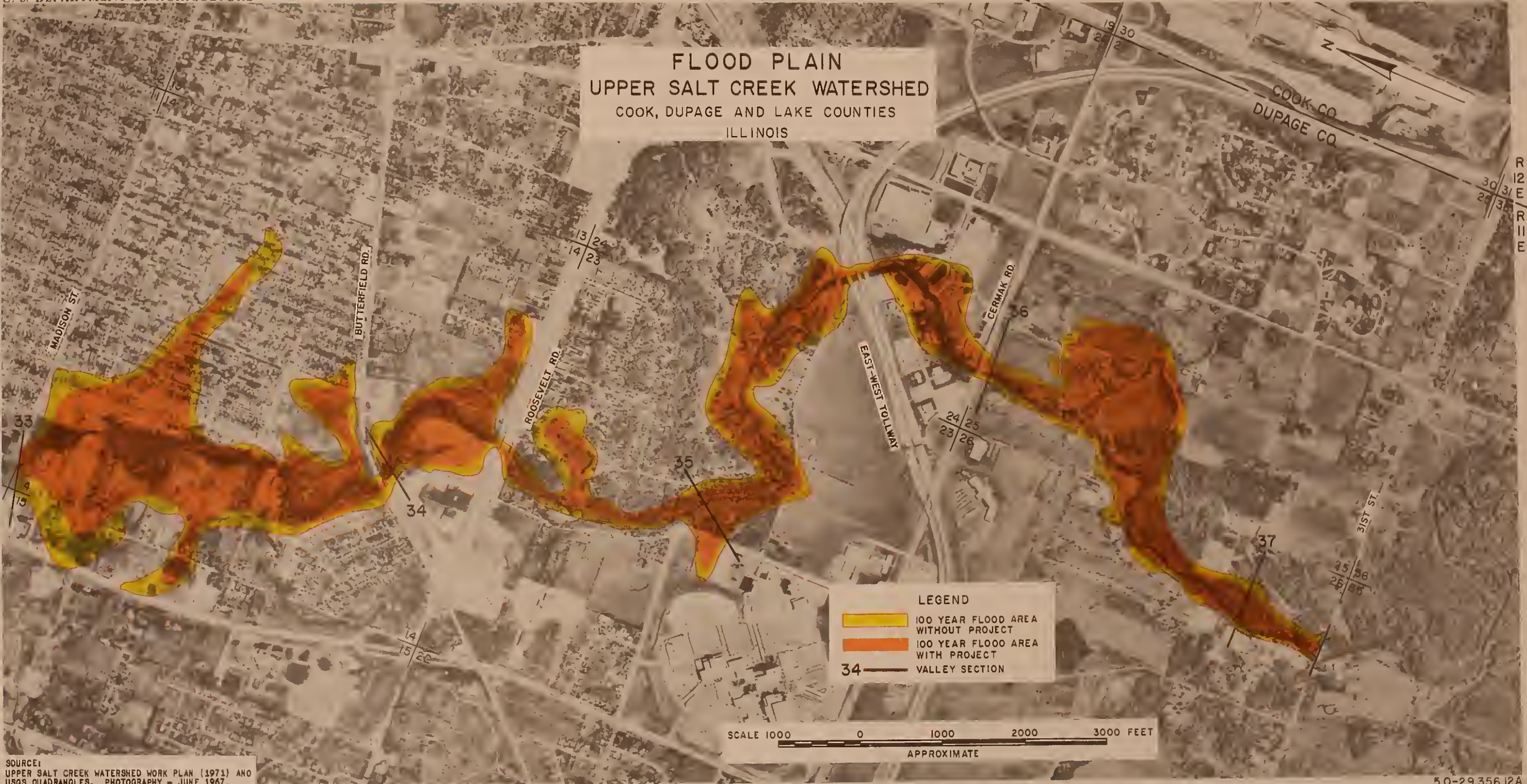
FLOOD PLAIN
UPPER SALT CREEK WATERSHED
COOK, DUPAGE AND LAKE COUNTIES
ILLINOIS



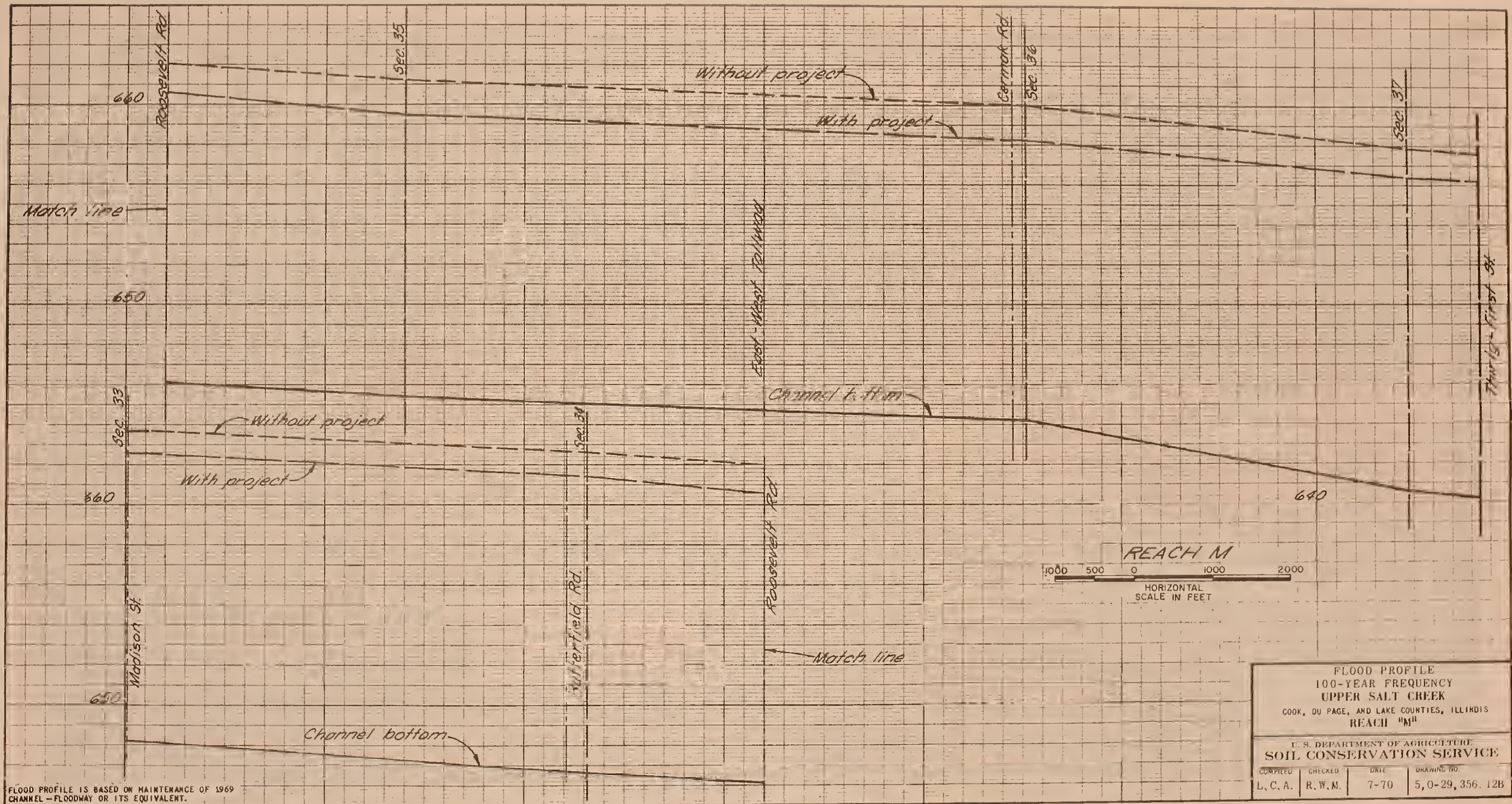


FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
CHANNEL - FLOODWAY OR ITS EQUIVALENT.

FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH "L"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED L. C. A.	CHECKED R. W. M.	DATE 7-70	DRAWING NO. 5,0-29,356.11B



SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADRANGLES. PHOTOGRAPHY - JUNE 1967.
USDA-DC-LINCOLN, NEBB, 1971

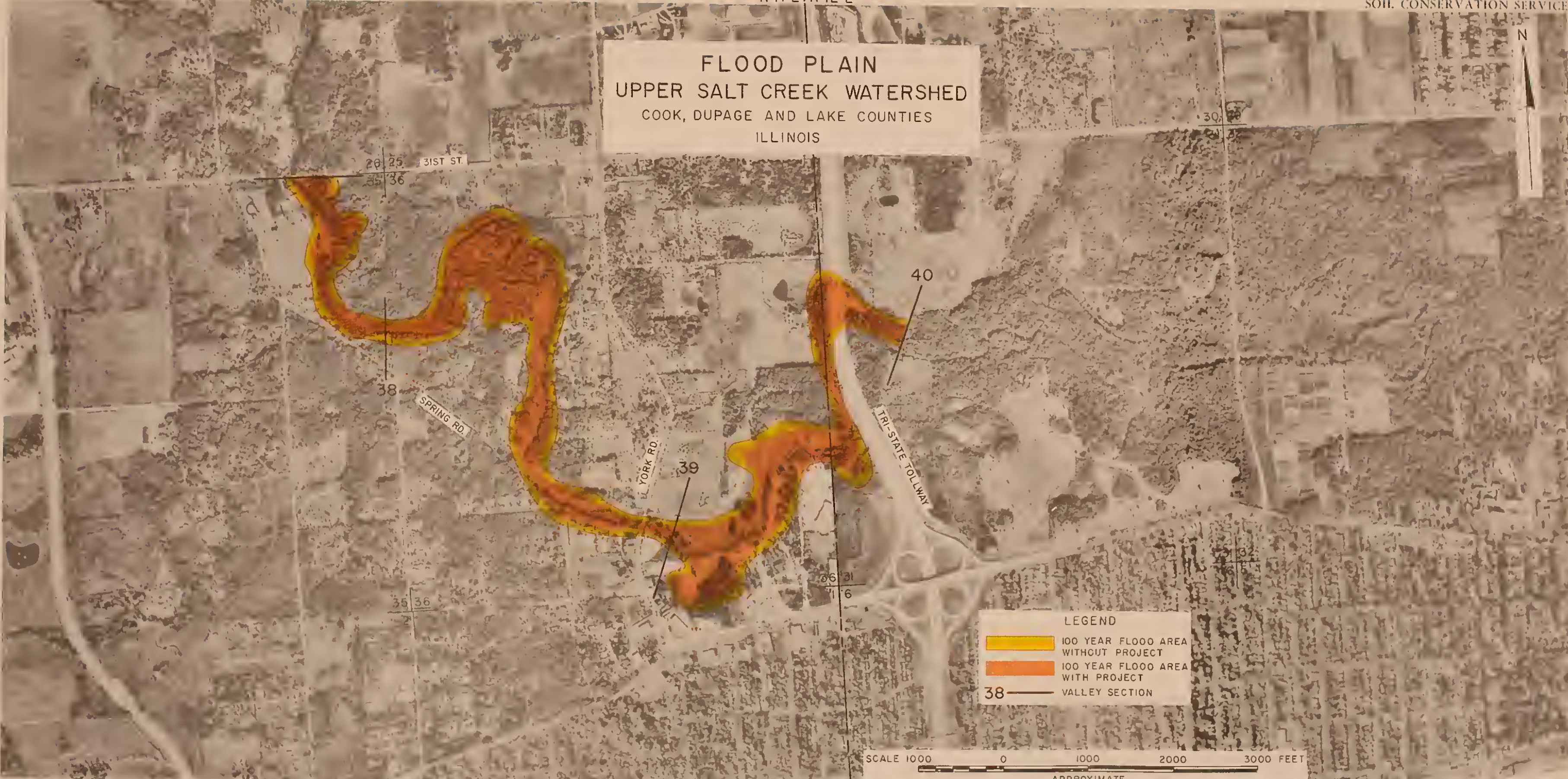


FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
CHANNEL - FLOODWAY OR ITS EQUIVALENT.

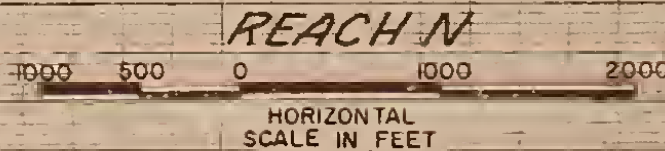
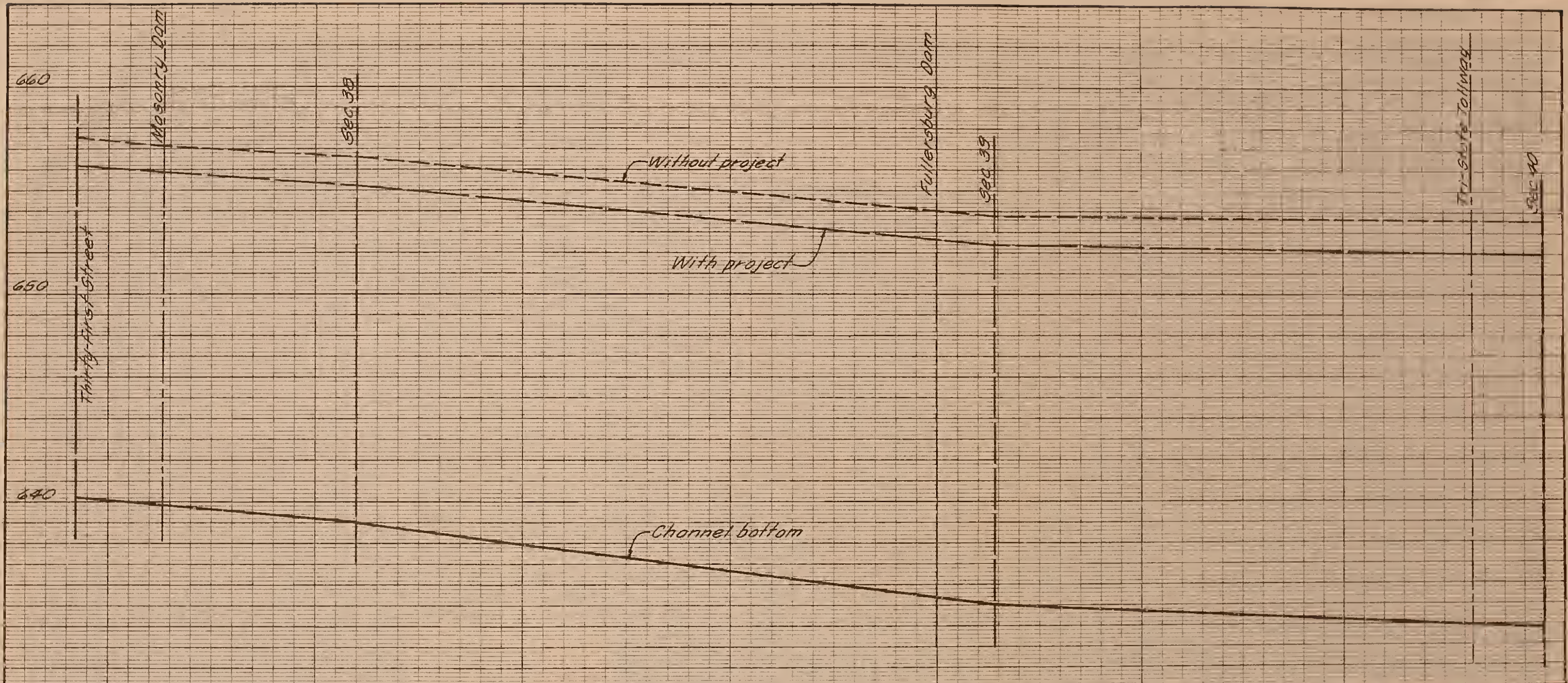
FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH "M"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
L. C. A.	R. W. M.	7-70	5,0-29,356.12B

FLOOD PLAIN
UPPER SALT CREEK WATERSHED
COOK, DUPAGE AND LAKE COUNTIES
ILLINOIS

N



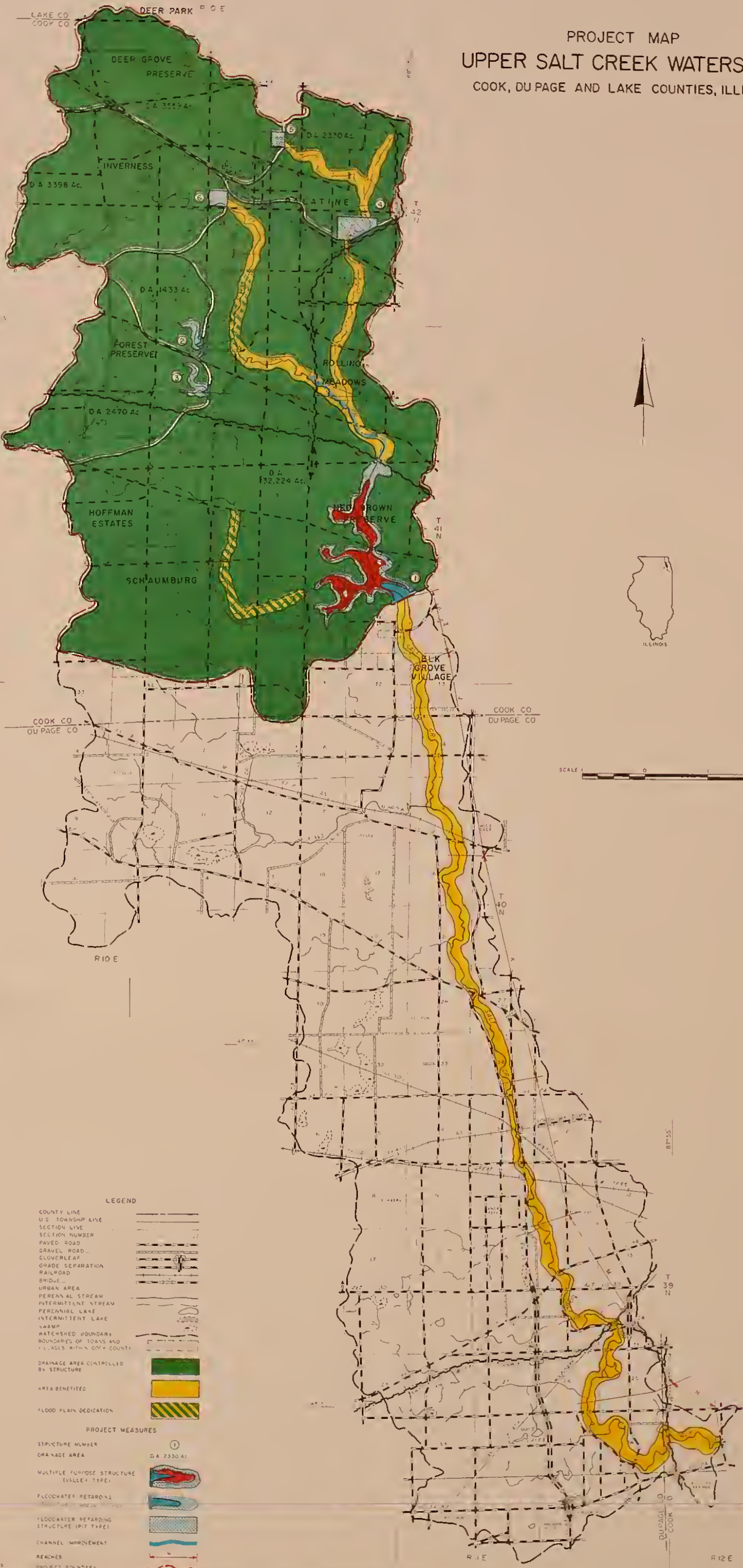
SOURCE:
UPPER SALT CREEK WATERSHED WORK PLAN (1971) AND
USGS QUADANGLES. PHOTOGRAPHY - JUNE 1967.
USDA-ACS/LINCOLN, NEBR 1974



FLOOD PROFILE 100-YEAR FREQUENCY UPPER SALT CREEK COOK, DU PAGE, AND LAKE COUNTIES, ILLINOIS REACH "N"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
L. C. A.	R. W. M.	7-70	5,0-29,356.13B

FLOOD PROFILE IS BASED ON MAINTENANCE OF 1969
CHANNEL - FLOODWAY OR ITS EQUIVALENT.

PROJECT MAP
UPPER SALT CREEK WATERSHED
COOK, DU PAGE AND LAKE COUNTIES, ILLINOIS



SOURCE
1:25,000 S.M. 21,838 AND DATA
FURNISHED BY FLD. TECHNICIANS

(POLYCONIC PROJECTION)

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N
R 12 E
3-42-44
5,8-28,679

